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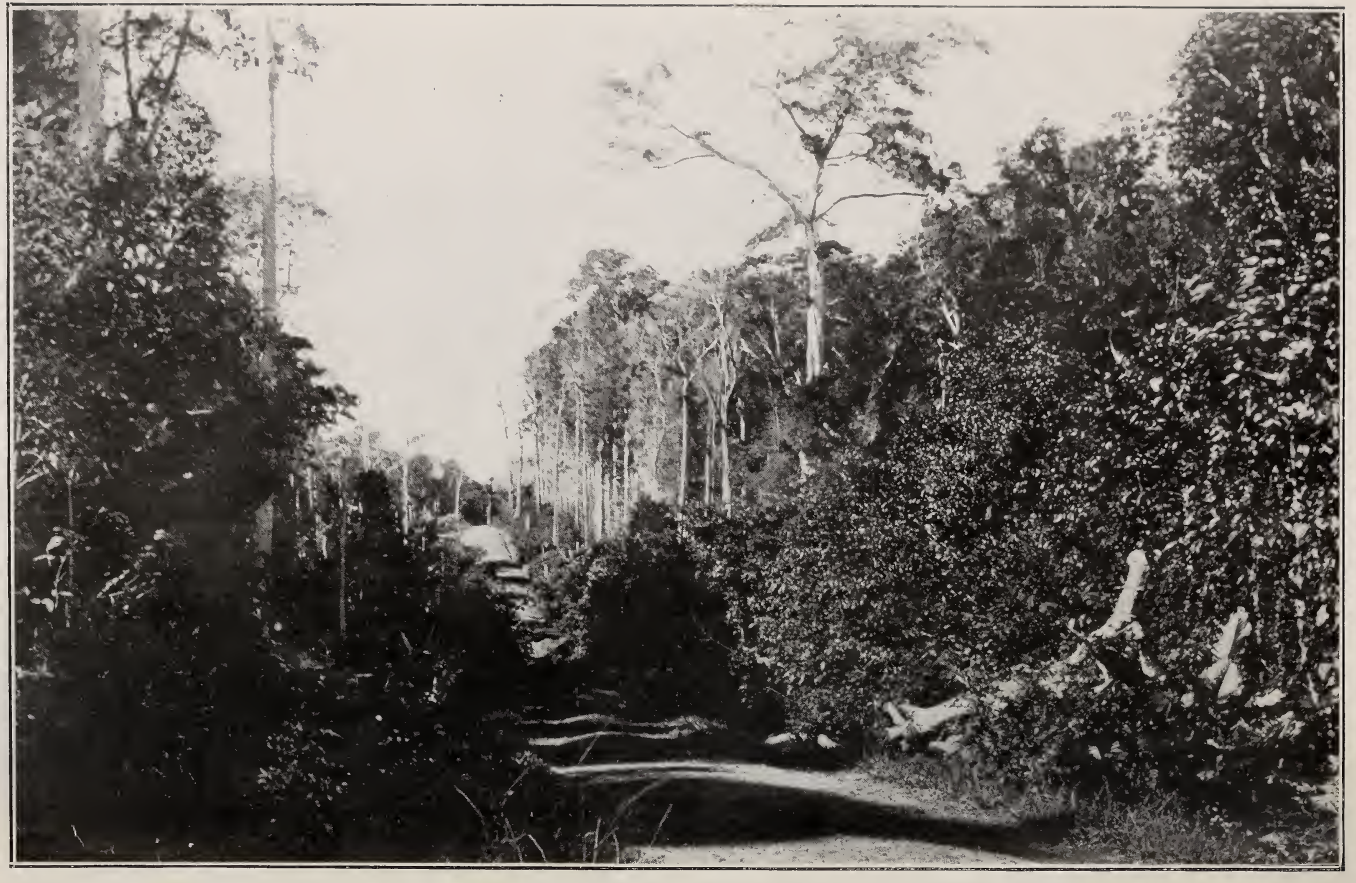
Australian Rain-Forest Trees

Excluding the Species confined to the Tropics



Road through rain forest of a tropical character at Kin Kin, east of Gympie, about 26.2° S. The large tree shown against [illegible] the middle of picture is *Ficus eugenioides*. The large-leaved plant on lower right is *Alocasia macrorrhiza*.

Australian Rain-Forest Trees

Excluding the Species confined to the Tropics

By
W. D. FRANCIS
(Assistant Botanist, Department of Agriculture and Stock, Brisbane).

With 213 full-page, half-tone Illustrations, 25 Text Figures and 1 Rainfall Map.

Registered by the Postmaster-General for
transmission through the post as a book.

Wholly set up and printed in Australia for the Commonwealth Government by Anthony
James Cumming, Government Printer, Brisbane.

1929.

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To the Memory of

FREDERICK MANSON BAILEY

Colonial Botanist of Queensland, 1881-1915.

HE DEVOTED HIS LIFE TO THE STUDY OF AUSTRALIAN PLANTS.

PREFATORY NOTE

With the approval and support of the Australian National Research Council, the Commonwealth Meteorologist, the Commonwealth Inspector-General of Forests, and the Director of the Commonwealth Solar Observatory, a memorandum dealing with publication of scientific works was presented to the Vice-President of the Executive Council (Senator the Rt. Hon. Sir George F. Pearce) at the end of 1927 by the Council for Scientific and Industrial Research. It was pointed out that first-class scientific work by Australian investigators was sometimes in danger of being lost to subsequent workers owing to the impossibility of securing its publication. The resources of scientific societies were usually inadequate for the printing of extensive works, and from their restricted appeal such works were often unattractive to commercial publishing houses. It was recommended that a sum of money be provided annually on the Estimates of the Prime Minister's Department to cover the cost of printing and publishing highly meritorious scientific memoirs which otherwise would not become generally available.

The Commonwealth Government gave its approval to the proposal and appointed a small committee to administer the fund provided, subject to the authority of the Vice-President of the Executive Council. The members of this Committee represent the Council for Scientific and Industrial Research (Dr. A. C. D. Rivett), the Commonwealth Treasury (Mr. H. J. Sheehan), and the Australian National Research Council (Dr. W. G. Duffield, until his death in August 1929). The present work on the Rain-forest Trees of Australia by Mr. W. D. Francis is the second to be published upon its recommendation.

FOREWORD

Some years ago Mr. W. D. Francis and myself started a work on the rain-forest ("scrub") trees of subtropical Eastern Australia and commenced a series of articles in the "Queensland Agricultural Journal," the idea being to obtain blocks so that something could be brought out later in book form at a comparatively cheap rate.

From the commencement, however, due principally to pressure of other work on my part, the articles were very largely the work of Mr. Francis, and after a few had been published I withdrew, leaving the field entirely to him.

The author has spent many years botanising in New South Wales and Queensland, and, before his appointment as Assistant Government Botanist of Queensland, lived for about ten years at Kin Kin, one of the richest rain-forest belts in subtropical Australia. He has always had an especial fondness for the rain-forest flora. He has an intimate field knowledge of the trees of which he writes, and I do not know anybody better fitted to write a work of this type.

A distinctive feature in the work is that the descriptions are all original; in some cases they have been drawn up from living material, in other cases from the material in the Queensland Herbarium. The book must make a strong appeal to botanists, foresters, and that ever-growing circle of Australians who take a general interest in trees and, in fact, all that pertains to plant life.

C. T. WHITE,
Government Botanist, Brisbane, Queensland.

AUTHOR'S PREFACE

At the inception of this work it was intended to describe and illustrate about 100 of the principal, large species of trees of the rain forests. Subsequently it was thought advisable to make the work more comprehensive. In fulfilment of this purpose brief descriptions of the less important species of trees were added. As far as practicable it has been my object to include all Australian rain-forest species except those confined to the tropics. In determining which species are rain-forest ones, I have been directed chiefly by personal knowledge. In the principal descriptive works there has been very little discrimination as to the type of forest the species inhabit. In view of the circumstances, it is to be expected that at least some omissions of rain-forest species will be detected.

In the attempt at comprehensiveness, unfortunately it happens that many of the descriptions are much less detailed than others. To have expanded the shorter descriptions to the size of the large, earlier ones would have brought about a desirable degree of uniformity, but the size of the work would have been multiplied and the expense of publication correspondingly increased. The species whose range is confined to the tropics have been excluded because of insufficient knowledge of their field characters. They could not be described with the same degree of familiarity as the large trees of the rain forests situated in the subtropical parts of Eastern Australia. However, a large number of the species found in the rain forests of the subtropical portion of the continent extend into the tropics. Because of this northerly extension of the range of many species, a knowledge of the trees described in this work is certainly helpful to persons studying the trees in the tropical rain forests of Northern Queensland. Apart from the actual species common to the tropics and subtropics, many of the purely tropical species are allied to species in the subtropics. In many instances the tropical species can be assigned to their families by a person familiar with the species in the rain forests within the subtropics.

At the commencement of the work it was recognised that the usual botanical descriptions are unintelligible to the average reader. This fact has come under my notice repeatedly. For this reason the descriptions have been made as simple as possible and technical terms avoided as far as practicable. In the detailed descriptions (to the number of about 100) the field characters of the trees are given special attention. These field characters in the past have been very much neglected. The notes on the bark in the descriptions were made in the field and in most cases from the specimens illustrated.

The artificial division of the species into groups and the subdivision of the groups were prepared while the manuscript was in the hands of the Publications Committee in Melbourne. In the absence of the manuscript some of the floral characters used in the subdivision of the species were taken from the descriptions in Bentham's magnificent work, the "Flora Australiensis."

In some instances the brief descriptions of the families and the characters used in the keys distinguishing the genera are restricted to these groups as they are represented within the scope of the work. This limitation to the definition of some of the families and genera was adopted to assist non-botanical readers in the pursuit of identification. The definition of plant families and genera in a general sense has already been stated in several works devoted to that purpose.

The sequence of the families in the descriptive portions is in accordance with the system of Engler and Prantl.

The majority of the Australian rain-forest trees is confined to Australia. In all cases where species are known to extend beyond Australia I have endeavoured to record the fact in the account of the distribution of the individual species. It is possible, however, that some species which are found beyond Australia have been overlooked.

In comparing living material with the illustrations of the leaves, flowers and fruit it should be remembered that the great majority of these illustrations is of dried material. In some cases dried and living material of the same species have a somewhat different appearance.

Acknowledgments.—Mr. C. T. White, Government Botanist of Queensland, provided the facilities which enabled me to visit several of the rain-forest areas of Southern Queensland for the purpose of obtaining field photographs and notes on the trees. The photographs of the leaves, flowers, and fruits were taken by the official photographers of the Department of Agriculture and Stock—Mr. H. W. Mobsby, Government Photographer, and Mr. W. J. Sanderson, Assistant Government Photographer.

Mr. E. Graham, Under Secretary, Department of Agriculture and Stock, Brisbane, approved of the manuscript being submitted for publication to the Inspector-General of Forests. He also agreed to the utilisation of the process blocks in the possession of his Department. Mr. C. E. Lane-Poole, Inspector-General of Forests, kindly undertook to recommend the publication of the work to the Commonwealth Government. The cordial advocacy of its publication by Mr. Lane-Poole in the first instance was an inducement to improve and extend the work. The Chairman of the Provisional Forestry Board of Queensland, Mr. E. H. F. Swain, in some instances co-operated with Mr. White in obtaining facilities for me to visit rain-forest areas under the control of the Board. Several of the officers of the Provisional Forestry Board assisted me at various times to secure specimens and to photograph

trees. In reply to a request, Mr. N. W. Jolly, the Commissioner of Forests of New South Wales, kindly supplied me with particulars of the location and character of rain-forest areas north of Newcastle in New South Wales. These details, and a map of New South Wales with many annotations by Mr. Jolly, were very serviceable in the preparation of the outline of the distribution and character of Australian rain forests contained in the introductory portion of the work. The writer's father, Mr. Alfred Francis, communicated an account of the rain forests of the Milton and Tilba Tilba districts of Southern New South Wales. This was useful in preparing the material on the forests of New South Wales.

During his visit to Australia in 1928, Dr. A. W. Hill, Director, Royal Botanic Gardens, Kew, was shown the plan of the work. I understand that Dr. Hill, in a communication to Dr. A. C. D. Rivett, Chief Executive Officer, Commonwealth Council for Scientific and Industrial Research, recommended its publication. Although Dr. Hill so generously advocated its publication, it is due to him to mention that he did not see the whole of the manuscript but only examples of the descriptions and illustrations.

The Right Honourable Sir George Pearce, Vice-President of the Executive Council, made the final decision to publish the work. The recommendation to this effect emanated from the Committee named in the Prefatory Note. Dr. Rivett, in his capacity as Chief Executive Officer of the Commonwealth Council for Scientific and Industrial Research and as a member of the Publications Committee, performed a very significant part in securing the publication of the work. His tactful and reassuring communications to me were a constant encouragement.

To all of these gentlemen, who have contributed to the preparation of the work or to its publication, I am deeply indebted. I tender them my grateful thanks.

Appreciative acknowledgment is also expressed to Mr. J. F. Reid, Editor of the "Queensland Agricultural Journal," Mr. W. J. Buzacott, Editor of the "Queenslander," and the Councils of the Royal Society of Queensland and Linnean Society of New South Wales for the use of a number of the process blocks with which this work is illustrated.

My wife assisted in the reading of the proofs.

In conclusion I acknowledge gratefully my indebtedness to the Government Printer, Brisbane, and the members of his staff who have been concerned with the printing. Their courtesy, co-operation and interest have greatly facilitated the task of seeing the work through the press.

W.D.F.

Botanic Gardens, Brisbane, Queensland.
10th October, 1929.

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Australian Rain-Forest Trees

GENERAL REMARKS ON RAIN FORESTS.

Rain forests consist of closely spaced, dense vegetation composed mostly of trees, shrubs, vines, and herbaceous plants. Sometimes they are so dense that it is difficult or impossible to penetrate them without the use of cutting tools. There is a very noticeable suppression of the special adaptations to dry conditions such as are evident in the open Eucalyptus and Acacia forests in Australia. These adaptations to dry conditions are typified by toleration of effects of bush fires, narrow leaves with twisted stalks which only expose the edges (or minimum areas) of the leaf-blades to the sun, and rigid, hard-textured leaves.

In rain forests, especially in those of a luxuriant character, the trees harbour numerous plants known as epiphytes. These epiphytes grow on the trees but are not parasites. They do not penetrate the living tissues and live upon the abstracted juices. The commonest epiphytes in rain forests are ferns, orchids, and lichens.

Luxuriant rain forests of the tropics and subtropics usually possess a certain number of species of trees which develop at the base of their stems flattened extensions of their roots and stems. These peculiar extensions are known as buttresses. They impart a very characteristic appearance to the trees on which they develop and are suggestive of tropical luxuriance.

Rain forests are not confined to any particular continent. They are fairly widely spread in those tropical and subtropical parts of the large land masses and islands which possess a comparatively continuous and high rainfall. Plant development is seen at its highest in tropical rain forests. In these forests vegetation has attained a climax. So great is the number and diversity of species in tropical rain forests that many of the forests have been or are being destroyed before their constituents are scientifically investigated.

In Eastern Australia rain forest is often referred to as scrub, brush, and jungle.

DISTRIBUTION OF RAIN FOREST IN AUSTRALIA.

On the mainland, rain forest is almost confined to the eastern portion from Cape York in the extreme north-east to Cape Otway in the south-east. It is found on the coastal lands, coastal highlands, or parts of the Great Dividing Range. So far as the writer is aware it rarely penetrates inland beyond 100 miles from the coast. Within the extreme limits outlined above its distribution is discontinuous. It is interrupted by larger areas of forest of a much more open and drier type, much of which is composed of species of Eucalyptus as dominant forms. The exact definition of the distribution of rain forest through such a large tract could only be accomplished by a botanist with surveying experience and several years allotted to the task. Apart from the comparatively large tracts of continuous rain forest there are very many small patches distributed within the extreme points already stated. These numerous small areas consist of strips and patches often only a few yards in breadth. They are found along watercourses, in sheltered, moist valleys, in damp mountain gorges, and on basalt-capped mountain tops or plateaus with a higher rainfall than the surroundings. These small patches are often found in the areas which separate the comparatively large tracts of continuous rain forest.

So far as known to the writer, the principal large tracts of continuous rain forest are or were found in the following parts, beginning in the north and proceeding southwards:—The area around Cairns extending southwards past the Tully River; the Atherton Tableland, which is situated to the west and south-west of Cairns and includes the townships of Atherton, Malanda, and Millaa Millaa; the Herbert River area near Ingham; the area to the north, south, and west of Mackay, including the township of Proserpine and the highlands of the Eungella Range* about 45 miles westward of Mackay; the area from Maryborough southwards to Landsborough, including the rain forests to the east of Gympie and the highlands of the Blackall Range; the area from the Macpherson Range (border of New South Wales and Queensland) southwards to the Richmond River, including the Tweed River and the towns of Lismore, Murwillumbah, and Bangalow, which are located in the area once known as the "Big Scrub"; and the Dorrigo highlands situated to the west of Coff's Harbour. In all of these areas clearing operations have reduced or almost entirely destroyed the rain forest. The "Big Scrub" of the Richmond and Tweed Rivers is almost completely annihilated. Very extensive clearing has also taken place on the Atherton Tableland and in the coastal area south of Cairns. The rain forest south and north of Gympie has dwindled to remnants through the progress of settlement.

Proceeding southwards from the Dorrigo, rain forests occur in three areas: the Comboyne (west of Port Macquarie), Bulga (west of Camden Haven), and Mount Royal and Barrington Tops (west of Taree, Manning River). The rain forests in these three areas are extensive and cover several thousands of acres.

South of the Hunter River some rain forest is found in the sheltered and damp valleys. Patches of it are or were located in the neighbourhood of Gosford.

West of Sydney the floors of the deep gorges of the Blue Mountains near the towns of Wentworth Falls, Katoomba, and Blackheath are clothed with more or less continuous rain forests.

To the south of Sydney the moist gorges of the Illawarra Range and the ranges to the west of Milton and Tilba Tilba and the highlands near Braidwood also carried rain forest.

In Victoria rain forests are found in sheltered places in the coastal country near Lake King, according to B. Spencer and C. French (Victorian Naturalist, 6, p. 1, 1889). In a map published in the Seventh Annual Report of the Forests Commission of Victoria (1927), temperate rain-forest species are shown as occurring in the forests to the north-east of Cape Otway.

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*A general account of the rain forest of this area is given in the writer's paper "The Rain Forest of the Eungella Range." Proc. Roy. Soc. Queensland, 39, 107-113, 1928.

TEMPERATE RAIN FOREST IN TASMANIA.

It is evident that Tasmania contains considerable areas of temperate rain forest. L. Rodway states that Beech or "Myrtle" (*Fagus Cunninghamii*) grows in damp, cool gullies but not in open forests (Handbook to Tasmania, Australasian Assoc. for Advancement of Science, Hobart, 1928, p. 51). In the same handbook (p. 58) Irby mentions that the beech forests are extremely extensive throughout the island, and that they are commonest in the north-west and the west coast districts. In the Flora Australiensis (vol. 6, p. 285, 1870) Bentham quotes Hooker to the effect that *Atherosperma moschatum* is common in beech forests throughout the island. It may be assumed that the Beech, *Atherosperma moschatum*, and possibly also the Blackwood (*Acacia melanoxylon*) are important constituents of the Tasmanian rain forests.

THE CHARACTER OF AUSTRALIAN RAIN FORESTS.

As already defined the Australian rain forests consist of a discontinuous band passing through the extreme eastern portion of the continent from north to south. By far the greater proportion of the species of trees in the Australian rain forests is confined to Australia. Only an insignificant number of the species extends beyond Australia, and most of these are found also in Papua, the Pacific Islands, Malaya, India, or South-eastern Asia. On the other hand it may be stated that with few exceptions the Australian rain-forest species belong to genera which are represented—or have allies—in Papua, the Pacific Islands, Malaya, India, or South-eastern Asia. Among the exceptions are the Beeches (*Fagus spp.*) of Tasmania, parts of Victoria, and some of the highlands of New South Wales and extreme Southern Queensland. The Beeches are often dominant species in these forests. They are allied to species in New Zealand and Terra del Fuego.

For purposes of comparison it is convenient to make an arbitrary division of the rain forests into two parts at about 29° S. in the vicinity or slightly to the south of the Richmond River in Northern New South Wales. The forests to the north of this artificial boundary are tropical in character. Some of the genera of trees most commonly met with are—*Tarrietia, Weinmannia, Flindersia, Dysoxylum, Cedrela, Elaeocarpus, Ficus, Eugenia, Cryptocarya, Endiandra, Litsea, Cinnamomum, Agathis, Araucaria.* In the luxuriant forests it is seldom possible to find one or a few species which could be regarded as dominant. In most cases the species constitution is very complex and often variable within short distances. Generally a very large number of species is present in a very limited area.

The rain forests of Tropical Queensland, even those in the Cairns region (16·5°–19° S.), are scarcely more luxuriant than those of Northern New South Wales between the Richmond River and Macpherson Range (28°–29° S.) or those of Southern Queensland to the east of Gympie (26°–27° S.). In the tropical forests of Queensland large-leaved species are a little more in evidence, and there is a greater variety of Palms including the Lawyer Palms (*Calamus spp.*). In the richer types of forest of the Atherton Tableland (17° S.), North Queensland, the trees may attain a slightly larger size than those in the heavy forests of Northern New South Wales and Southern Queensland.

Travelling southwards from the division arbitrarily placed at the Richmond River of Northern New South Wales, the effects of the temperate climate become evident: the tropical features begin to disappear; the number of species becomes less; the denseness of the forest shows signs of decreasing; the number and prominence of buttressed species diminish; and the tendency of Eucalypts and other open-forest types to enter into the composition of the forest is noticeable. All of these conditions become more pronounced as the passage southwards is continued. When Newcastle (33° S.) in New South Wales is reached many of the tropical characteristics of the forest have disappeared.

Concomitant with the diminution in the number of species, which is apparent south from the Richmond River, the tendency for the appearance of dominant species asserts itself. N. W. Jolly* states that on the coastal highlands of the Dorrigo (between 30° and 31° S.) the Coachwood (*Ceratopetalum apetalum*) sometimes almost monopolises the stand. In a letter to the writer Mr. Jolly mentions that the Bulga area to the west of Camden Haven (between 31° and 32° S.) is largely of the small Coachwood-Sassafras (*Ceratopetalum apetalum-Doryphora sassafras*) type. Farther to the south and in a direction west from Newcastle (33° S.) he indicates an area with narrow Coachwood brush in the gullies.

The floors of the deep gorges of the Blue Mountains at Wentworth Falls, Katoomba, and Blackheath (between 33° and 34° S.) support rain forests of a comparatively small type in which *Quintinia Sieberi*, Coachwood (*Ceratopetalum apetalum*), Sassafras (*Doryphora sassafras*), and Black Sassafras (*Atherosperma moschatum*) are conspicuous constituents. The Illawarra rain forests (34° to 35° S.) contained, among other species, Coachwood, Sassafras, Lillipilli (*Eugenia Smithii*), Red Cedar (*Cedrela Toona* var. *australis*), Black Apple (*Sideroxylon australe*), Rusty Fig (*Ficus rubiginosa*), and Cabbage-tree Palms (*Livistona australis*). In the rain forests of the Milton district (between 35° and 36° S.) the Giant Stinging tree (*Laportea gigas*), Lillipilli, Sassafras, and Cabbage-tree Palms were conspicuous. At Tilba Tilba near Mt. Dromedary (between 36° and 37° S.) the Giant Stinging tree, Lillipilli, and Sassafras have been noted as rain-forest species.

On the eastern coast of Victoria near Lake King (about 38° S.) B. Spencer and C. French† noted forests of Lillipilli. The same authors mention the Cabbage-tree Palms in the country to the east of the Snowy River (between 37° and 38° S.). On a map appearing in the Seventh Annual Report of the Forests Commission of Victoria (1927) the Otway Mountain forest (about 39° S.) is shown as including Myrtle Beech (*Fagus Cunninghamii*) and Blackwood (*Acacia melanoxylon*).

The relationship of the Eucalypts and Acacias to rain forest is interesting. The two large groups of trees represented by the Eucalypts or Gum trees and the Acacias or Wattles are among the most widely spread, the most diversified, and the most important of all Australian trees. Eucalypts are found in the moist parts of the continent and in many of its arid parts. In the heavy rain forests of a tropical character, which are located northwards of the Richmond River, the Eucalypts are absent or are only found on the margins. The Acacias, at least

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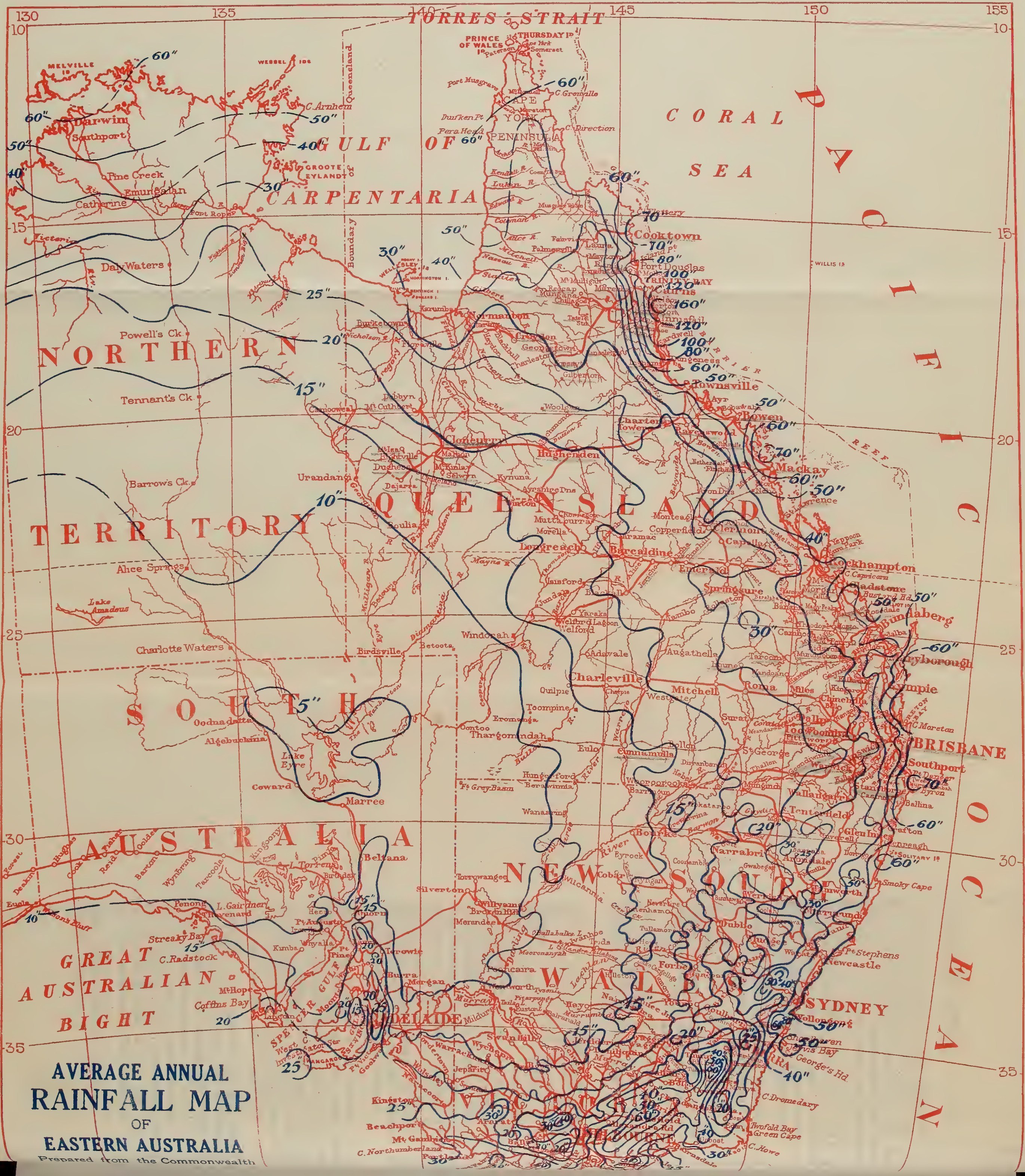
* Forestry Handbook for N. S. Wales, Empire Forestry Conference, p. 17, 1928.

† Spencer, B., and C. French, Victorian Naturalist, 6, 1, 1889.



AVERAGE ANNUAL
RAINFALL MAP
OF
EASTERN AUSTRALIA

Prepared from the Commonwealth

some of them, have outstripped the Eucalypts in adaptation to arid conditions, as they dominate the landscape of the Eremaea,* the dry, inland region stretching from Western New South Wales and Queensland across Central Australia to the West-Australian coast at Shark's Bay. And yet the Acacias have been slightly more successful than the Eucalypts in gaining representation in the humid, shadowy interior of the dense rain forests of a tropical type. The one species so adapted—so far as the writer is aware—is the Marblewood (*Acacia Bakeri*). The Marblewood is a large, long-stemmed, typical rain-forest tree which abounds in the dense forests between Maryborough and Mullumbimby (26°–29° S.) in Southern Queensland and Northern New South Wales. Another species of Acacia, the Blackwood (*Acacia melanoxylon*), is a very important constituent of the rain forests of the New South Wales highlands south of Sydney, those of parts of Victoria and possibly of those in Tasmania, too. Several Eucalypt species penetrate and attain very large dimensions in the rain forests southwards from the line near the Richmond River which defines somewhat arbitrarily the southern boundary of the rain forests of a tropical character.

AUSTRALIAN RAIN FORESTS CONSIDERED IN RELATIONSHIP TO RAINFALL.

Very prominent among the conditions which accompany rain forests in Australia is a high rainfall. The writer† has remarked that the luxuriant rain-forest areas of Queensland have an average annual rainfall approximating or exceeding 60 inches. This observation is applicable also to the heavy rain-forest areas of Australia. Commencing in the north and passing southwards the following large rain-forest tracts are characterised also by a rainfall approaching, equalling, or exceeding 60 inches per year:—The area to the north, west, and south of Cairns, North Queensland; the area including Proserpine, Mackay, and the Eungella Range; the area to the east of Gympie and extending to Landsborough, which is north of Brisbane; the area from the Macpherson Range (border of New South Wales and Queensland) to the Richmond River; and the area including Dorrigo to the west of Woolgoolga and Coff's Harbour. These areas include all of the well-known large tracts of luxuriant rain forests in Australia.

For the purpose of convenient reference the eastern portion of the Commonwealth Meteorologist's (Mr. H. A. Hunt's) average annual rainfall map of Australia, revised to 1924, is reproduced. A perusal of this map shows the marked discontinuity of the 60-in. isohyet. It is remarkable that, with a very few exceptions, the 60-in. isohyet indicates the proximity of heavy rain forest. The only exceptions to this generalisation are to be noted in a very small area to the north and north-east of Port Darwin, the extreme northern portion of Cape York Peninsula, and two very limited areas in the high mountain regions to the west and north of Gippsland, Eastern Victoria. The rainfall for Cape York as recorded by the Commonwealth Meteorologist‡ is almost confined to

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* Some interesting remarks on the Eremæa are contained in L. Diels's "Pflanzenwelt von West-Australiens," pp. 266, 269, 273, 1906.

† Francis, W. D. Some Characteristics of Queensland Rain Forests and Rain-forest Trees. Proc. Roy. Soc. Queensland, 34, 210, 1923.

‡ Hunt, H. A. Rainfall Observations in Queensland, 1914.

December, January, February, March, and April; the falls during the other months are very slight. Obviously such a prolonged dry season is quite sufficient to repress the development of heavy rain forest in the tropics where high evaporation is a condition. Possibly similar conditions prevail to the north and north-east of Port Darwin. Mr. C. C. Morton (a Government Geologist of Queensland), who has visited the extreme northern portion of Cape York Peninsula, informs the writer that there are patches of light "scrub" or rain forest in that region. He states that these scrubs are not comparable with the heavier ones farther south.

The rainfall in the rain forests of a tropical character, which are situated to the north of the Richmond River (Northern New South Wales) is heaviest in December, January, February, and March.

AUSTRALIAN RAIN FORESTS CONSIDERED IN RELATIONSHIP TO SOILS AND SOIL-FORMING ROCKS.

As the Equator is approached the relative importance of soil conditions is not so evident as in those instances of rain forests situated towards the temperate zone. Under tropical and subtropical conditions, the temperature and a heavy rainfall in combination with the accompanying high relative humidity appear to be sufficient to maintain rain-forest growth on comparatively poor soils. The alluvial soils along rivers and smaller streams often support rain forests. The rain forests in the gorges of mountains and hills are frequently located on soils which are composed to a certain extent of the surface soil and silt washed from the steep surfaces of the mountain and hill sides. In these forests of gorges and stream-sides moisture may often be a condition of the environment which is of considerable significance.

Several kinds of rock, upon disintegration, yield soils which support luxuriant rain forests. Many of the large tracts of rain forest in Australia are located on basaltic soils; some are found on granitic soils and at least one on schistose soil.

Basaltic soils predominate or are frequent in the large areas of luxuriant rain forest of the Atherton Tableland (south-west from Cairns), North Queensland (1); the Macpherson Range (border of New South Wales and Queensland) to Richmond River (2); and the Dorrigo Highland, west of Woolgoolga, New South Wales (2). Dr. H. I. Jensen informs the writer that the Blackall Range, which is clothed with luxuriant rain forest, is principally basaltic. The Blackall Range is situated in Southern Queensland to the north of Brisbane. Professor H. C. Richards (3) indicates basalts and andesites on Roberts Plateau and Tambourine Mountain, two well-known locations of heavy rain forest in Southern Queensland towards the border of New South Wales.

Luxuriant rain-forest areas in which granitic soils prevail are—The Bellenden-Ker Range, south of Cairns, North Queensland (1); the Eungella Range, westward of Mackay, at about 21° S. (4); and the area between Beenham Range and Kin Kin, eastward from Gympie, at about 26·2° S. (5).

The heavy rain forests of Kin Kin, eastward from Gympie, at about 26·2° S. are underlain by soils from phyllites and slates (5).

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2. Geological Map of New South Wales, Department of Mines, 1914.
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4. BALL, L. C. Queensland Geological Survey Publication No. 224, p. 27, 1910.
5. BALL, L. C. Queensland Government Mining Journal, 19, p. 58, Feb. 1918.

THE EFFECTS OF BUSH FIRES AND EXPOSURE ON AUSTRALIAN RAIN FORESTS.

One of the most marked differences between the constituents of rain forests and those of the open Eucalyptus forests is their behaviour towards fire. In most if not all cases the rain-forest constituents are killed by even slight contact with or proximity of the fires which periodically sweep through many of the Eucalyptus and open forests of Australia. The dark, fire-charred stems such as those of the Eucalypts and open-forest trees are not seen in the rain forests.

For many years the closely arranged formation of the rain forests appeared to present a formidable barrier to the settler in his clearing operations. When it was found that the trees of the rain forests or "scrubs" when felled and burnt were killed, it was realised that the rain forest was often more easily cleared than the Eucalyptus forests. Very many of the Eucalyptus and open-forest constituents persistently shoot after being felled and fired. The revival of these forests in this way makes the task of the settler in clearing operations a difficult one. On the other hand the extreme sensitiveness to the effects of fire, which is exhibited by rain forests, allows them to be cleared fairly expeditiously after they have been felled. In felling heavy rain forest a system known as "driving" is used to a great extent. A large tree, designated as the "driver," is felled upon a series of partly cut trees which are forced down with the weight of the "driver" as it falls.

The exclusion of bush fires is almost certainly due to the high relative humidity of the air in rain forests.

It has been noticed that, when small patches of rain forest are left in cleared areas, the large living trees on the margins often die gradually. Presumably their death is the result of exposure to which they are unaccustomed. Mr. A. A. C. Francis informs the writer that he has observed the behaviour of a large Fig tree (*Ficus eugenioides,* illustrated in Fig. 29) which was left standing in a small area of rain forest surrounded by cleared country. Owing to the removal of the other large trees the sun's rays had free access to the upper portion of the stem. After about ten years it was noticed that the stem decayed in that portion on which the sun shone. The tree is now slowly dying. The writer's informant believes that mature trees are much more subject to this kind of injury than are young, vigorous ones.

THE HEIGHT OF AUSTRALIAN RAIN FORESTS AND THE SIZE OF THE TREES.

The height of the rain forests of the luxuriant type situated in Queensland and Northern New South Wales does not often exceed 160 ft. The parts of these forests where the trees are comparatively small may be only about 80 ft. in height. A section through a rain forest, which can be seen on the edges of clearings, shows that the upper limit of the trees is very uneven. This is caused by the varying heights of the trees. Among the largest trees of the rain forest are the Australian Kauri Pines (*Agathis spp.*), Fig trees (*Ficus spp.*), and the Scrub Box (*Tristania conferta*). The largest specimens of the Southern Queensland Kauri (*Agathis robusta*) attained a height of 160 ft., a stem diameter of 7 ft., and an unbranched stem height of 90 ft. E. H. F. Swain* mentions a North Queensland Kauri (presumably *Agathis Palmerstoni*) with a stem circumference of 29 ft. at breast height. The Hoop Pine (*Araucaria Cunninghamii*) sometimes attains a height of 180 ft. The Fig trees are perhaps the largest of all rain-forest trees. The stem-like column of aerial roots of some species of Fig trees may attain a diameter of more than 10 ft. when measured above the flattened, buttressed roots. Very large specimens of the Scrub Box (*Tristania conferta*) sometimes attain 8 ft. in stem diameter near the surface of the soil. In the light rain forests the trees often do not exceed about 60 ft. in height and about 15 in. in stem diameter.

THE OCCURRENCE OF BUTTRESSES IN AUSTRALIAN RAIN-FOREST TREES.

One of the most remarkable features of rain forests of the tropics and subtropics is the peculiar flattened extensions of the roots and stems of some species of trees. These flattened extensions are known as buttresses or plank buttresses. According to references in literature, buttressed trees appear to be found in all the continental land masses which extend into the tropics and in several of the large tropical islands.

Some of the prominently buttressed Australian rain-forest trees are:—Fig trees—*Ficus spp.* (Moraceae); Domatia tree—*Endiandra discolor* (Lauraceae); Pink Marara—*Geissois Benthami;* Marara—*Weinmannia lachnocarpa;* Roseleaf Marara—*Ackama paniculata* (Cunoniaceae); Spurwood or Satinwood—*Dysoxylum Pettigrewianum*; Red Bean—*Dysoxylum sp.;* Red Cedar—*Cedrela Toona* var. *australis* (Meliaceae); Carribin—*Sloanea Woollsii*; Quandong—*Elaeocarpus grandis;* Blueberry Ash—*Elaeocarpus obovatus;* Mountain Beech—*Elaeocarpus Kirtonii* (Elaeocarpaceae); Booyong, Hickory or Crow's foot Elm—*Tarrietia Argyrodendron;* Black Jack—*Tarrietia actinophylla* (Sterculiaceae); Giant Watergum—*Eugenia Francisii;* Small-leaved Watergum—*Eugenia Luehmanni;* Eungella Gum—*Eugenia hemilampra* and *Eugenia sp., Eugenia cyanocarpa;* Giant Ironwood—*Syncarpia subargentea* (Myrtaceae).

From the foregoing list of buttressed trees it is evident that this peculiar structural feature is not confined to any particular family of plants, but occurs in species and genera of families which are often widely separated from each other. Buttresses are often noticeably developed in comparatively young trees. The writer found them to be well established in young trees of *Weinmannia lachnocarpa, Tarrietia Argyrodendron, Endiandra discolor*, and *Sloanea Woollsii* when these trees had attained one-seventeenth to one-ninth of their maximum stem diameter and one-fourth of their maximum height. This observation does not support the hypothesis which attributes the origin of buttresses to the direct effects of strain or tension induced by forces acting on the upper aerial parts of the trees. The young trees already mentioned as possessing evident buttresses were sheltered in the forest and were much below the size at which they normally develop large crowns or become exposed to the strain-producing force of winds.

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* Swain, E. H. F. Timbers and Forest Products of Queensland, 76, 1928.

Vertical sections of the buttresses of *Tarrietia Argyrodendron* var. *trifoliolata* show that their structure is extremely excentric. In a buttress which had attained one-third of the maximum height of the buttresses in this variety, the original centre of the root was situated at a distance from the base of the buttress represented by about one-twentieth of the perpendicular height of the buttress (see Fig. 2, No. 1).

In all instances of prominently buttressed mature trees which the writer has examined, a decided diminution was observed in the size of the stem or axis of the tree from above the buttresses towards the point of contact of the axis with the soil. In a specimen of *Sloanea Woollsii* this reversed taper of the axis of the tree reduced the axis at the soil surface to three-eighths of its diameter above the buttresses. An examination of Fig. 2, Nos. 5 and 6, will make the explanation clearer.

It is computed that in *Tarrieta Argyrodendron* var. *trifoliolata* the roots alone contributed to the structure of the buttresses in trees up to 20·16 cm. (8 in.) in stem diameter, and that in subsequent development the stem performs a large part in building up the buttresses.

Conditions with which buttressed rain-forest trees are associated are a heavy rainfall, high relative humidity, the absence of much direct sunlight on the soil surface, and an extensive development of surface roots.

In discussing the causes of buttresses the following factors are suggested as possible originating or contributing agents:—High relative humidity, the absence of much direct sunlight on the soil surface and the humus content of the upper layer of rain-forest soil. The comparatively high humus content of the soil towards the surface because of the avidity for oxygen of humus would retard oxygenation of the subsoil. The badly aerated soil may cause the roots to extend upwards into the air and thus contribute to buttress formation.

Examples of buttressed stem are represented in Figs. 1, 2, 29, 31, 53, 69, 75, 81, 85, 115, 121, 140, 156, 158, 160, 164, 165, 166, 174, 176, 177, 188, 189, 193, 200, 218.

Buttresses are described and discussed in detail by the writer in a paper "The Development of Buttresses in Queensland Trees," Proc. Roy. Soc. Q'land, 36, 21-37, 1925. References to literature are contained in this paper.

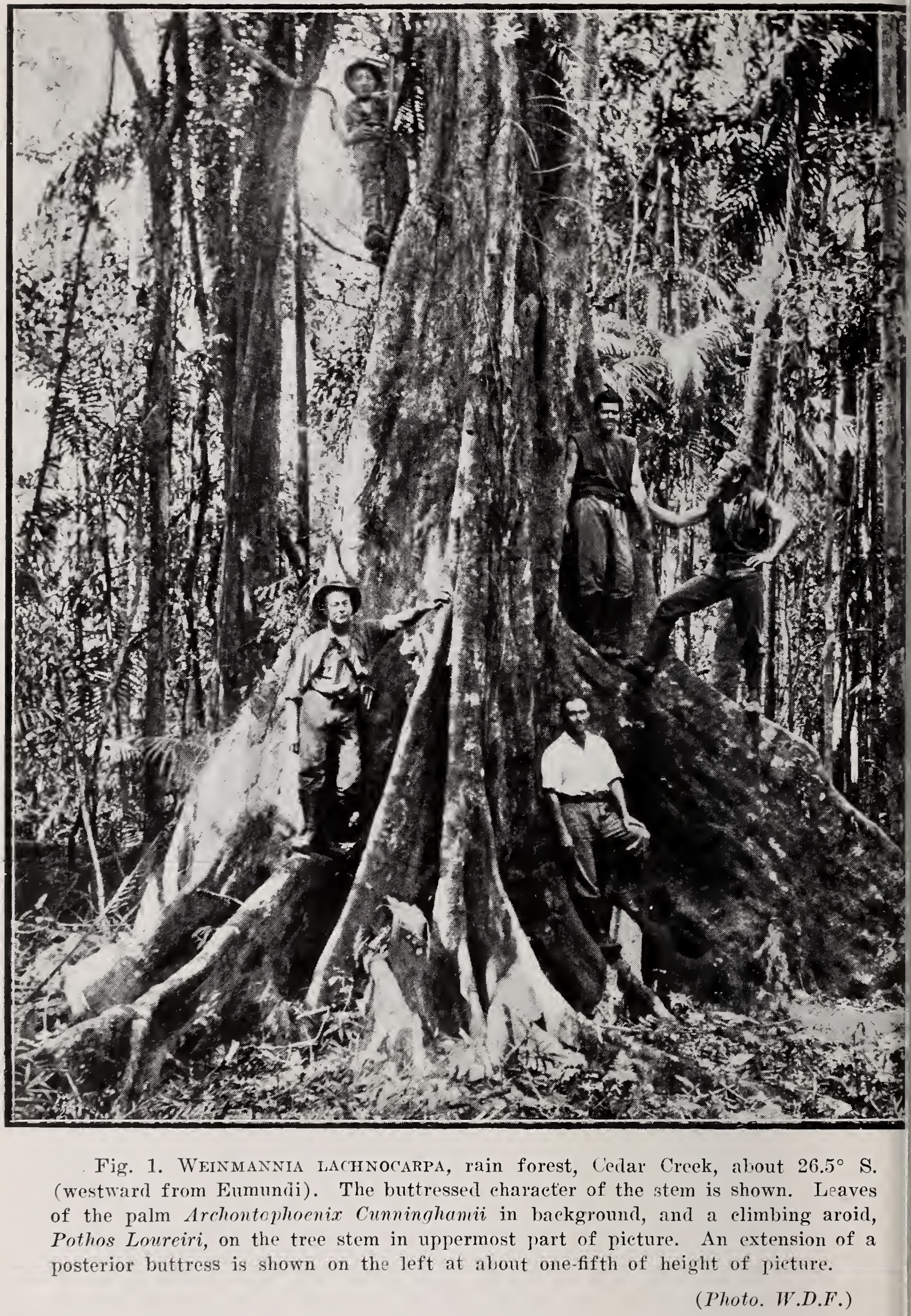


Fig. 1. WEINMANNIA LACHNOCARPA, rain forest, Cedar Creek, about 26.5° S. (westward from Eumundi). The buttressed character of the stem is shown. Leaves of the palm *Archontophoenix Cunninghamii* in background, and a climbing aroid, *Pothos Loureiri,* on the tree stem in uppermost part of picture. An extension of a posterior buttress is shown on the left at about one-fifth of height of picture.

(*Photo. W.D.F.*)

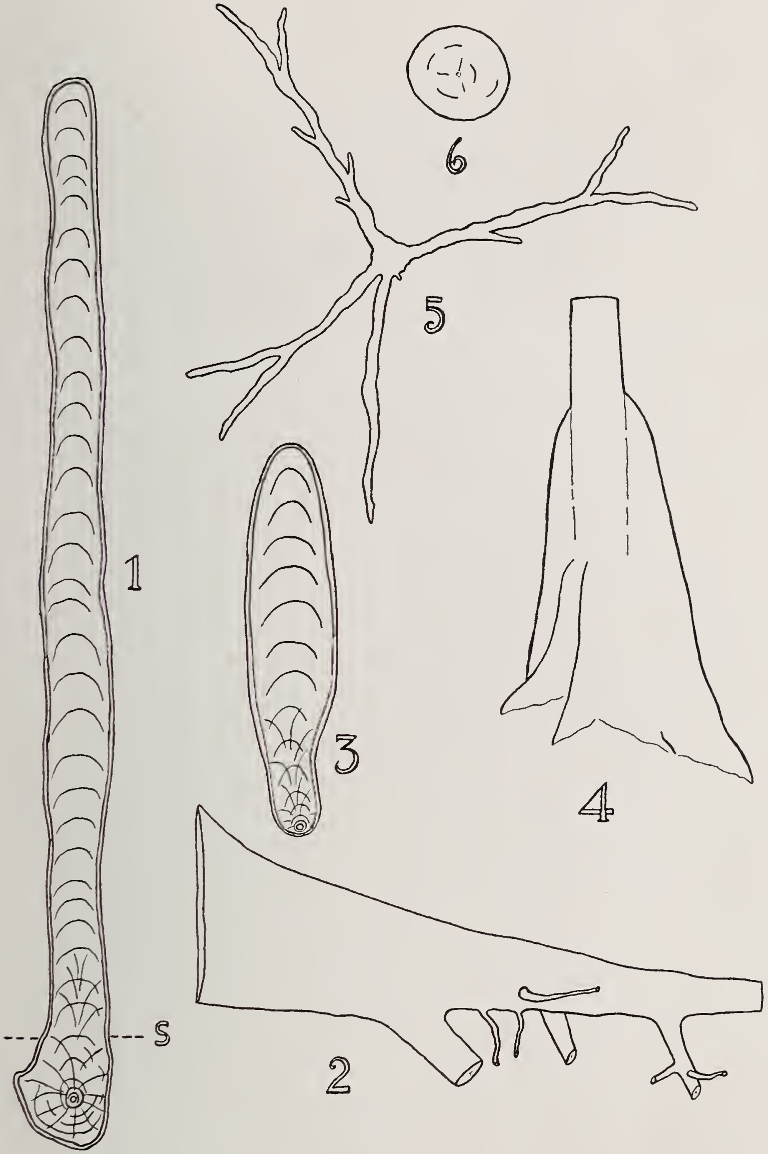


Fig. 2.—1. Vertical transverse section of buttress of *Tarrietia Argyrodendron* var. *trifoliolata* × $\frac{1}{6}$. 2, Buttress of young tree of foregoing variety which had attained 9·6 cm. in stem diameter × $\frac{1}{4}$. 3, Vertical transverse section of same buttress × $\frac{1}{2}$. 4, Diagram of basal part of stem of *Echinocarpus Woollsii* × $\frac{1}{96}$. 5, Transverse section of stem of same tree at the soil surface × $\frac{1}{48}$. 6, Transverse section of stem of same tree immediately above buttresses × $\frac{1}{48}$. S, surface of soil.

Reprinted, by permission, from the writer's paper in Proc. Roy. Soc. Queensland, 36, 1925.

THE FLANGED STEMS OF SOME AUSTRALIAN RAIN-FOREST TREES.

Several trees of the rain forests have fluted or channelled stems. Stems of this type are not cylindrical. When cut across they are seen to be angular or subangular in section. An examination of Fig. 3 may be more instructive than reading the description. Some of the principal trees with flanged or fluted stems are—Churnwood or Soap Box

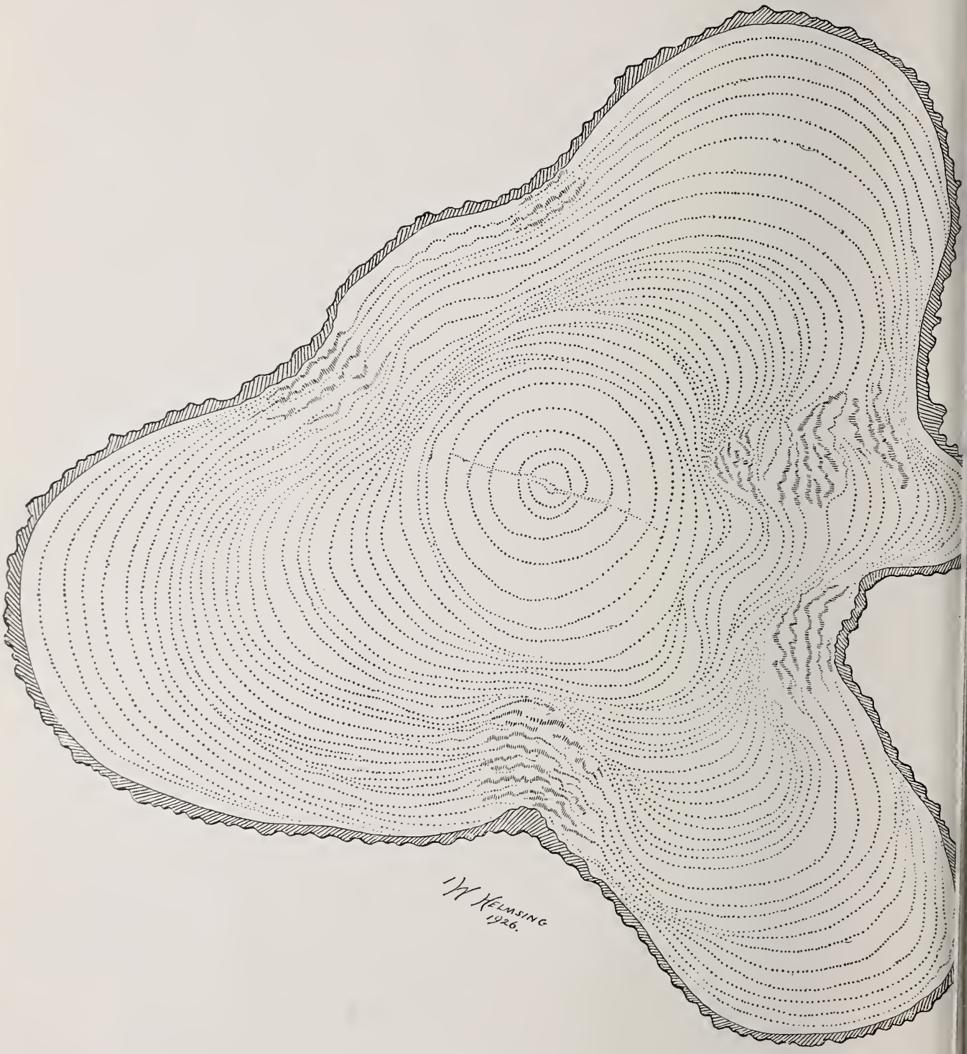


Fig. 3.—Transverse section of stem of *Villaresia Moorei,* one-quarter natural size. Section cut 8 feet from ground. The dotted lines represent some of the more conspicuous rings of growth. The shaded areas indicate patches of parenchyma. The bark is shown by the heavier shading on the exterior. The section was taken from a tree growing on the Bunya Mountains. Reprinted, by permission, from the writer's paper in Proc. Roy. Soc. Queensland, 38, 1927.

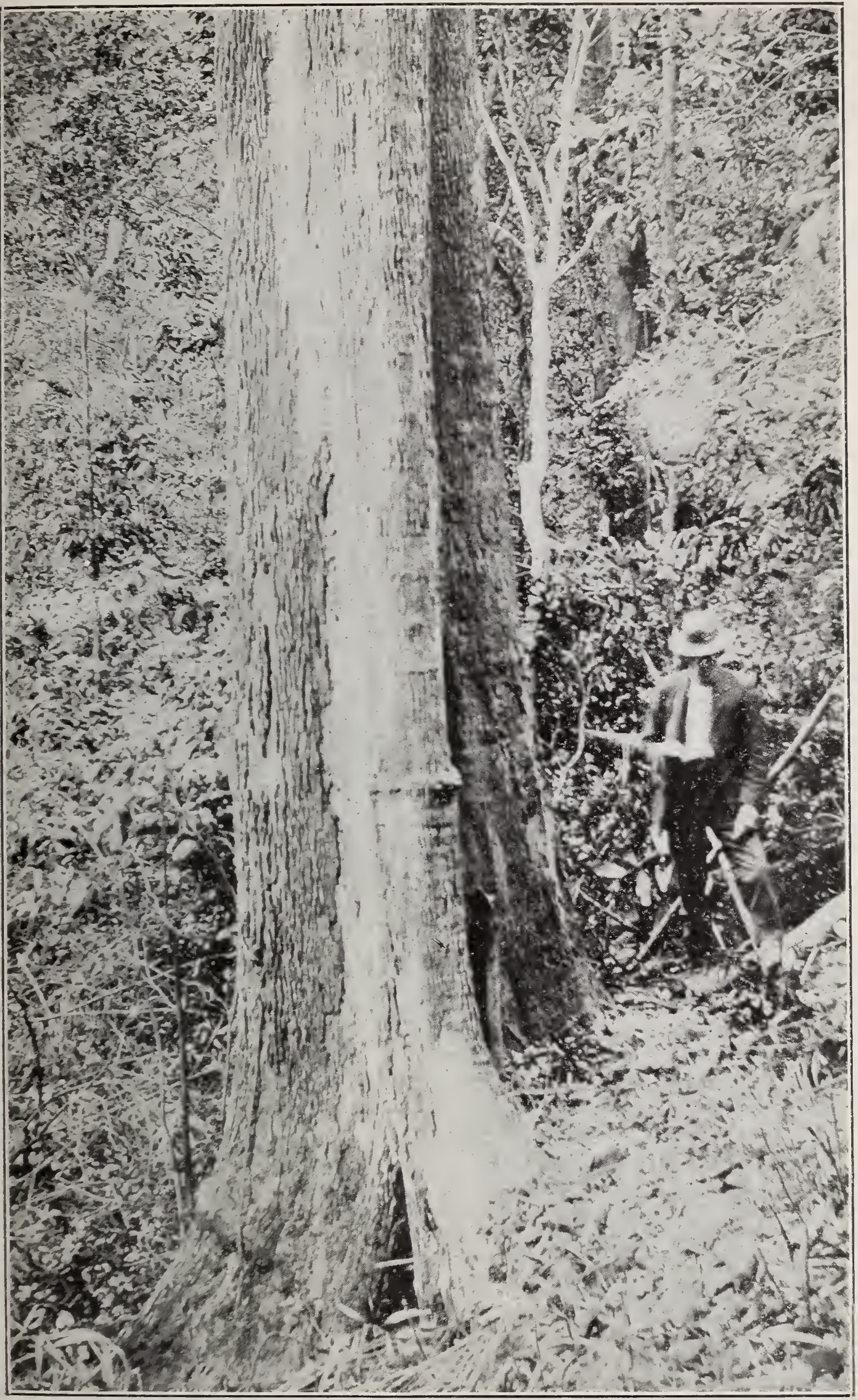


Fig. 4.—Lower portion of stem of *Villaresia* (*Chariessa*) *Moorei*. The tree represented grew on a hillside in rain forest at Kin Kin, about 26.2 deg. S. (eastward from Gympie). The angular form of the stem is evident. The continuity of the projecting angles of the stem with the principal surface roots is shown. Reprinted, with permission, from the writer's paper in Proc. Roy. Soc. Queensland, 38, 1927.

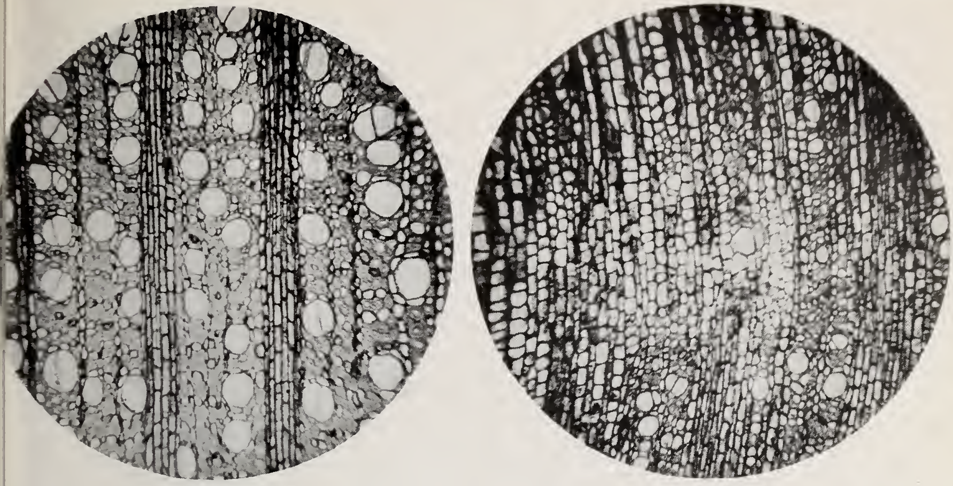
(*Photo. W.D.F.*)

(*Villaresia Moorei*), Lignum-vitae (*Vitex Lignum-vitae*), Black Apple or Black Plum (*Sideroxylon australe*), Koda (*Ehretia acuminata*), Scrub Turpentine (*Rhodamnia trinervia*), White Myrtle (*Rhodamnia argentea*), and Milky Pine (*Alstonia scholaris*). The Giant Stinging tree (*Laportea gigas*) often has a flanged stem. Some of the flanged or fluted stems resemble buttressed stems, but the perpendicular extension of the roots is not so prominent in the flanges. In addition the flanged or fluted shape is often carried much farther up the stem than are buttresses.

The writer has made a somewhat detailed investigation of the flanged stem of the Churnwood (*Villaresia* (*Chariessa*) *Moorei*). A transverse section of a stem of this species showed on examination that the young tree preserved a comparatively cylindrical stem until it attained a stem diameter of about 7 in. (17·5 cm.). Afterwards the section of the stem began to assume an angular shape, and growth in thickness towards the angles or extrusions proceeded at three times the rate of growth in the direction of the grooves. The beginning of irregular growth was followed by the convergence of the wood rays in their outward course in the sectors bounded by the grooves. In these sectors the convergent wood rays often increased in breadth and were accompanied by the occasional extinction of the vessels and wood fibres. The places of the disappearing vessels and wood fibres were occupied by patches of parenchyma. Finally folds or crenulations in the zones of growth appeared in the outer parts of the sectors bounded by the grooves. Some of the features described can be seen in Fig. 3. The microscopic structure of the normal wood and that in parts of the sectors bounded by the grooves is shown in Fig. 5, Nos. 1 and 2. The convergent rays and the folded zones of growth are somewhat suggestive of lateral pressure. This suggested pressure can be assumed to have arisen from the more rapid growth of the stem in the direction of its angles or extrusions. The angles or extrusions of the stem are continuous with the principal surface roots and are therefore associated with the development of these roots (see Fig. 4).

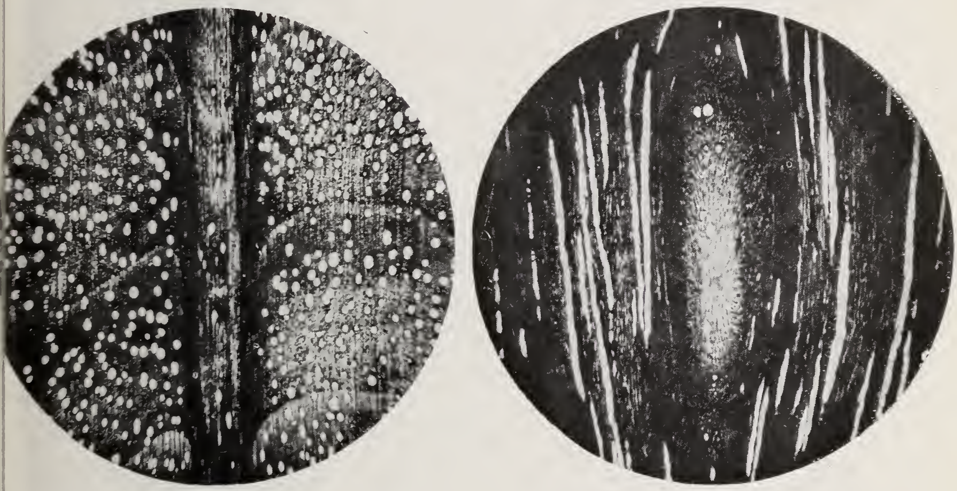
The flanged stem of *Villaresia Moorei* is described and discussed in detail in the writer's paper, "The Development of the Corrugated Stems of Some Eastern Australian Trees," Proc. Roy. Soc. Queensland, 38, 62-65, 1927.

Notes on the Photomicrographs in Figs. 5 and 6.—The round light areas in 1, 2, 3, 5, 6, 7, 9, 11 represent vessels in cross-section. A few transversely sectioned vessels are also seen towards the median area of 4. The fairly long, large, light areas on both sides of 4, towards middle and sides of 8, towards sides of 10 and 11 are vessels in longitudinal section. The dark-coloured linear structures passing from top to bottom of 1, 3, 5, 6, 7, 9, 11 are rays in section. The rays are shown in cross-section in 8 and 10 as spindle-shaped areas tapering at each end and containing minute dot-like cells. Part of a large aggregate ray occupies the whole of the median portion of 12. The two dark downwardly bent lines crossing 9 represent wood parenchyma. The dark area in the lowermost part of 5 shows part of a small brown patch (apparently resulting from injury possibly by insect attack) to which a sapwood indentation was traced. Inflected zones of growth are shown above or outwards from the dark patch. In 6 the same section as in 5 is shown but the view includes portion a little further towards centre of stem. The very fine meshwork shown in the ground-mass of 5, 6, 7, 9 represents the wood fibres in cross-section. The fine occasionally wavy lines passing from top to bottom of 10 represent the walls of the wood fibres in longitudinal section. The indistinct lines composed of minute, dot-like, light areas on the lower right of 11 consist of wood parenchyma in cross-section.



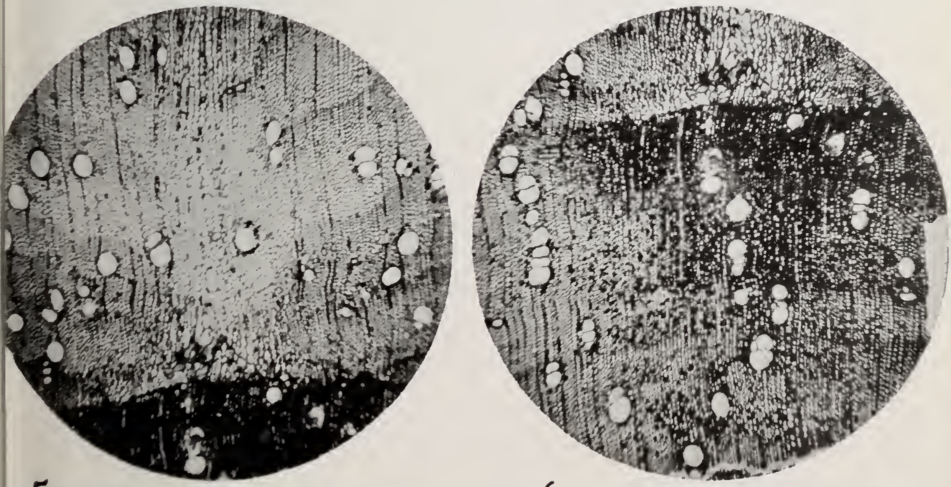
1. Villaresia Moorei × 35

2. Villaresia Moorei × 35



3. Arytera Lautereriana × 8·5

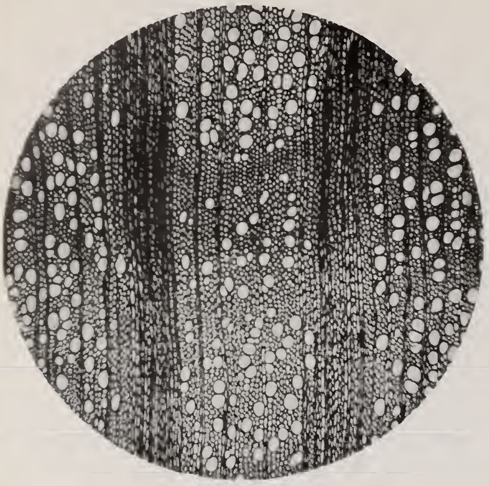
4. Arytera Lautereriana × 8·5



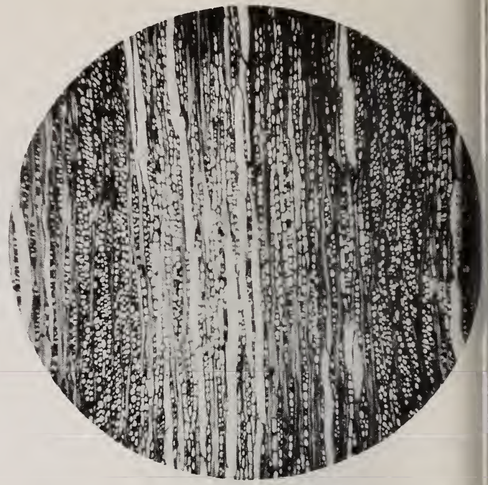
5. Arytera Lautereriana × 35

6. Arytera Lautereriana × 35

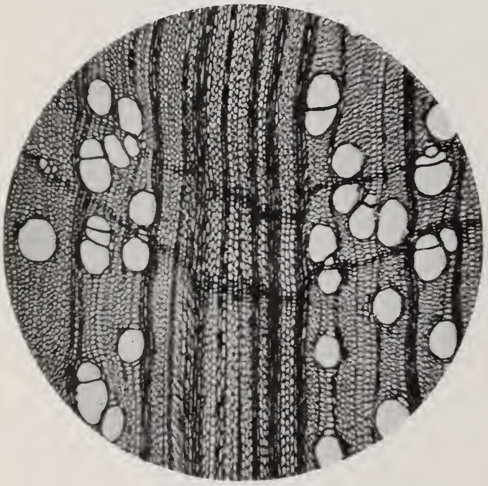
Fig. 5.—Reprinted, by permission, from the writer's paper in Proc. Roy. Soc. Queensland, 38, 1927. (*Photomicrographs: W.D.F.*)



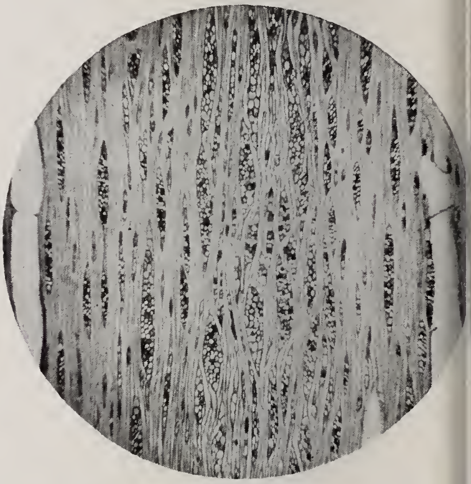
7. Canthium latifolium × 35



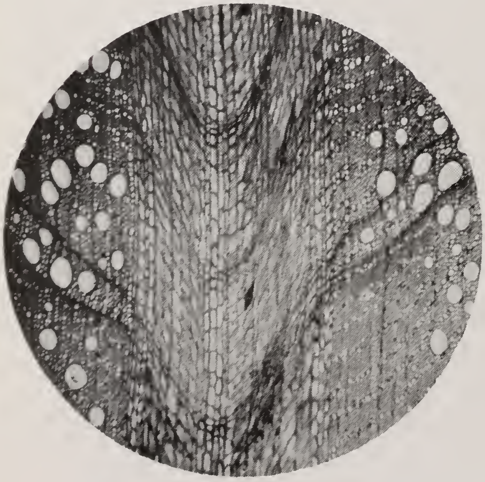
8. Canthium latifolium × 34



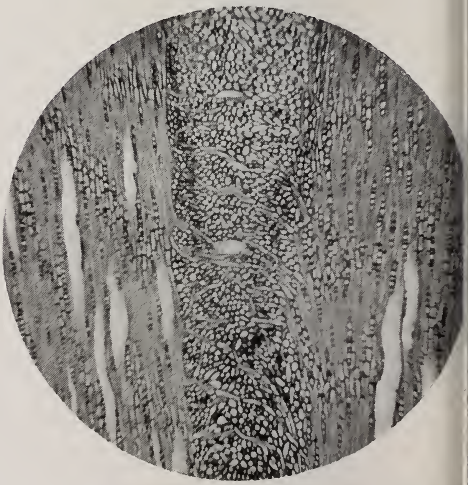
9. Cryptocarya corrugata × 35



10. Cryptocarya corrugata × 34



11. Casuarina inophloia × 37



12. Casuarina inophloia × 36

Fig. 6.—Reprinted, by permission, from the writer's paper in Proc. Roy. Soc. Queensland, 38, 1927. (*Photomicrographs: W.*

THE CORRUGATED WOODY CYLINDERS OF SOME AUSTRALIAN RAIN-FOREST TREES.

A number of species of rain-forest trees have a wrinkled or corrugated sapwood surface. This peculiarity is seen when the bark is removed from the trees which exhibit this characteristic. The names Corduroy and Washing-board tree are sometimes applied to these trees. The similarity of the wrinkled surfaces to corduroy cloth and to the ridged formation of a washing-board is the obvious explanation of these common names. Fig. 7 illustrates the appearance of the surface of the sapwood of the Corduroy Tamarind. The corrugations are often more regular in the species of *Canthium*.

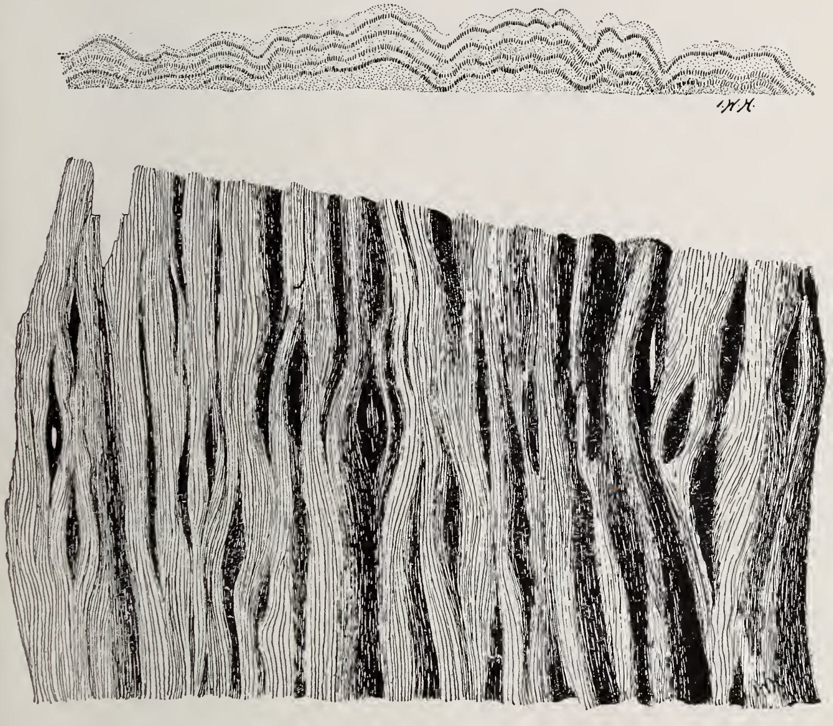


Fig. 7, natural size. Upper: transverse section of outer part of stem of large tree of *Arytera Lautereriana* with bark removed, showing the irregular outline of the surface of the sapwood and the irregular zones of growth. Lower: part of the stem of large tree of *Arytera Lautereriana* with bark removed, showing the corrugated surface of the sapwood. Reprinted, by permission, from the writer's paper in Proc. Roy. Soc. Queensland, 38, 1927. Drawings by I. W. Helmsing.

The principal species in which the writer has observed the wrinkled surface of the sapwood are—*Cryptocarya corrugata* (Washing-board tree of the Eungella Range) [Lauraceae]; *Alectryon connatus*, *Guoia semiglauca*, *Diploglottis Cunninghamii* (Native Tamarind), *Sarcopteryx stipitata* (Corduroy), *Arytera Lautereriana* (Corduroy Tamarind) [Sapindaceae]; *Canthium latifolium* (?) and *Canthium coprosmoides* [Rubiaceae].

A wrinkled sapwood surface is found also in some of the open forest trees such as the Thready-bark Oak (*Casuarina inophloia*); Forest Oak (*Casuarina torulosa*), and Black Oak (*Casuarina suberosa*).

In all of the instances of wrinkles or indentations in the sapwood surface it was found that large aggregate rays in the wood terminated in the indentations. Directly inwards from the indentations and in the interior of the woody cylinders, very marked inflexions of the growth rings occur where the rings are crossed by the large aggregate rays. Both the sapwood indentations and the inwardly bent growth rings are most prominent in large, mature trees. The aggregate rays associated with the indentations and with the inflexions of the growth rings often occur in pairs. Figs. 5, 6, photomicrographs 3-12, illustrate the microscopic structure of the wood in the neighbourhood of the inflected growth rings in several species of trees. Photomicrographs 3, 5, 6, 7, 9, 11 are of transverse sections; 4, 8, 10, 12 illustrate longitudinal (tangential) sections; in 4 a few vessels are shown in transverse section.

A more detailed account of the corrugations or wrinkles on sapwood surfaces will be found in the writer's paper, "The Development of the Corrugated Stems of Some Eastern Australian Trees," Proc. Roy. Soc. Queensland, 38, 65-76, 1927.

THE BARK OF AUSTRALIAN RAIN-FOREST TREES.

There is a considerable degree of diversity in the appearance, thickness, and structure of the bark among the many species in the rain forests.

The colour of bark often varies in the same species. The commonest colours met with are greys and browns. Many instances are met with in which it is difficult to decide whether the bark should be described as grey or brown. Often exposure to the sun may convert a brown bark into a light grey one. In instances of this kind the original colour may be due to substances such as phlobaphenes, which are derived from tannins. Prolonged exposure evidently bleaches the phlobaphenes or other colouring matters.

The most noticeable type of bark is the very smooth, green or brown-coloured, thin barks of the Ironwood (*Myrtus Hillii ?*) and Giant Ironwood (*Syncarpia subargentea*). The colours of these barks are often bright. The bark of an Ironwood 10 in. in stem diameter measured $\frac{1}{16}$ in. thick; that of a Giant Ironwood 3 ft. in stem diameter was $\frac{1}{8}$ in. thick. Very few, if any, other Australian rain-forest trees have such thin, smooth barks. The Marara (*Weinmannia lachnocarpa*) has a thin bark but not a very smooth one. On one of these trees with a stem diameter of 2 ft. 3 in. the bark measured $\frac{3}{16}$ in. thick. It is not often, except in very large trees, that the thickness of the bark exceeds 1 in. The bark of the Bunya Pine (*Araucaria Bidwilli*) sometimes measures several inches in thickness. The Flame Tree (*Brachychiton acerifolium*) also has a thick bark. On a tree 2 ft. 8 in. stem diameter it measured $1\frac{7}{8}$ in. in thickness.

A few of the trees have barks somewhat similar in appearance to that of the Ironbarks of the Eucalyptus forests. These barks are deeply fissured or furrowed. The most common rain-forest trees with barks of this kind are White Cedar (*Melia Azedarach* var. *australasica*), Scrub Ironbark (*Bridelia exaltata*), and Red Ash (*Alphitonia Petriei*). Other species in which the fissures or furrows of the bark are slightly less deep and large are Scrub Bottle Tree (*Brachychiton discolor*), Queensland

Bottle Tree (*Brachychiton rupestre*) Flame Tree (*Brachychiton acerifolium*), Churnwood (*Villaresia Moorei*), Southern Silky Oak (*Grevillea robusta*).

The scaly-barked species are fairly common. Some of the most frequent of these are Deep Yellow-wood (*Rhodosphaera rhodanthema*), Bolly Gum (*Litsea reticulata*), Crow's Ash (*Flindersia australis*), Yellow-wood (*Flindersia Oxleyana*), Crow's Apple (*Owenia venosa*), Red Cedar (*Cedrela Toona* var. *australis*), White Beech (*Gmelina Leichhardtii*), Rosewood (*Dysoxylum Fraseranum*), Scentless Rosewood (*Synoum glandulosum*), Southern Penda (*Xanthostemon oppositifolius*).

Yellow-coloured inner barks are found in several species when the inner parts are exposed by cutting through the bark. Almost all the species of *Elaeocarpus* which the writer has observed have yellow inner barks. Examples are—Blueberry Ash (*Elaeocarpus obovatus*), Mountain Beech (*Elaeocarpus Kirtonii*), Blue Quandong (*Elaeocarpus grandis*), *Elaeocarpus foveolatus, Elaeocarpus ruminatus* and *Elaeocarpus sericopetalus.* The last three species are found in tropical Queensland forests. The species of *Elaeocarpus* often have a yellow sapwood surface in addition. Yellow inner barks are also found in Lignum-Vitae (*Vitex Lignum-vitae*) and Black Bean (*Castanospermum australe*).

Bright ochre and orange-coloured intermediate layers of bark are often found in two species of the family Celastraceae. When the outermost layer of bark is peeled off a bright, brownish yellow layer is often exposed in the Ivorywood (*Siphonodon australe*) and a bright orange layer in the Orange Bark (*Celastrus dispermus*). Somewhat similarly coloured barks may be found in other species of the family.

The bark of a number of species exudes a milky juice or latex when cut or bruised. This peculiarity is possessed by the majority or a number of the species of the families Sapotaceae, Moraceae and Apocynaceae. Of the Sapotaceae the Black Apple (*Sideroxylon australe*) often exudes only a slight amount of milky juice. The Sandpaper Fig (*Ficus stenocarpa*) included in the Moraceae, is exceptional and possesses a clear sap. The remaining species of *Ficus* (Fig Trees) and *Pseudomorus Brunoniana* yield a fairly abundant milky exudate. Some species of Ochrosia (*O. elliptica* and *O. Kilneri*) belonging to Apocynaceae do not possess a milky sap in the bark, but the juice expressed from the pulp of their fruits is white. The milky Pine (*Alstonia scholaris*), a very common Apocynaceous tree in the tropical rain forests, exudes a large amount of milky juice. The Scrub Poison Tree (*Excaecaria Dallachyana*) of the family Euphorbiaceae yields a large amount of latex when its bark and green parts are wounded.

The Scrub Bloodwood (*Baloghia lucida*) owes its common name to the fact that its bark is stained by a reddish brown sap which is often collected into scattered and hardened spots which often give the bark a rough appearance. When the bark of this species is freshly cut the sap, when it first appears, is often colourless and clear. The deep red colour appears after a few seconds exposure to the air. This colour-change on exposure is suggestive of the presence of tannin in the sap. The living bark and young wood of the Native Olive (*Olea paniculata*) and of some species of *Notelaea,* when cut and exposed to the air for about 10 minutes, turn a pink colour.

In a number of instances rain-forest trees can be identified by the characteristic odour of their bark and wood. The bark and sapwood of the several kinds of Sassafras (*Cinnamomum Oliveri, Cinnamomum Laubatii, Doryphora sassafras, Atherosperma moschatum* and *Daphnandra aromatica*) have a very strong, pleasant odour of sassafras. In some cases, as for instance in *Cinnamomum Oliveri,* there is also a noticeable fragrance of camphor. *Cinnamomum Laubatii* and *Daphnandra aromatica* are tropical species. The Mango Bark (*Protium australasicum*) has in its bark a smell resembling that of mangoes. Some species of *Dysoxylum* and other members of the family Meliaceae often have a disagreeable odour comparable with that of freshly-cut onions. In Meliaceous plants this onion-like odour seems to be associated sometimes with a more pleasant smell, such as that found in the Red Cedar. The Turnipwood (*Akania Hillii*) has a strong odour like that of turnips. *Panax elegans,* often known as Celery-wood, has a faint smell somewhat like that of celery. The bark and young parts of the Black Bean (*Castanospermum australe*) when broken or cut have a smell resembling that of the cucumber or pumpkin. The bark of trees belonging to the family Lauraceae is very frequently more or less aromatic. The bark of the Native Cascarilla (*Croton insularis*) has an odour like that of official cascarilla bark.

A few species have barks armed with prickles. Conical prickles are very abundant on the bark of the Thorny Yellow-wood (*Zanthoxylum brachyacanthum*). Prickles are almost always present on the bark of *Capparis nobilis.* They are also frequent on the stems of the Bat's Wing Coral Tree (*Erythrina vespertilis*), but often disappear from the stems of large trees. The branchlets and branches of the three species are often armed with prickles.

REMARKS ON THE STRUCTURE AND SHEDDING OF THE BARK.

The appearance of the bark is influenced to a great extent by the manner in which it is shed. The manner of shedding or exfoliation is brought about by several factors. Of these factors the internal structure of the bark is one of the most important. In very many instances a layer of periderm is formed in the outer portion of the living bark. The periderm is a tissue of a cork-like nature. It is impregnated with fat-like substances which apparently prevent the transfer of nutrient solutions from the inner living tissues of the bark to the tissues on the outer side of the periderm. In this way the outer bark is cut off from active co-operation with the inner living tissue and in consequence dies. In course of time the outer dead bark is thrown off. Before it is shed it is often modified during the process of contraction which it undergoes while drying. The contraction often causes fracturing and fissuring. In this way scales, flakes, and fissures are formed. The internal structure can be anticipated to determine to some extent the form of the pieces into which the dead bark becomes resolved in drying. Long strands of bast fibres in the bark would tend to cause the dead bark to break up into long ridges or flakes. The formation of fissures and scales is also contributed to by the expansion consequent upon growth. The pressure developed by the gradually increasing circumference of the expanding stem exerts a stretching effect upon the bark. Under the influence of the stretching the outer dead bark tends to fissure and fracture.

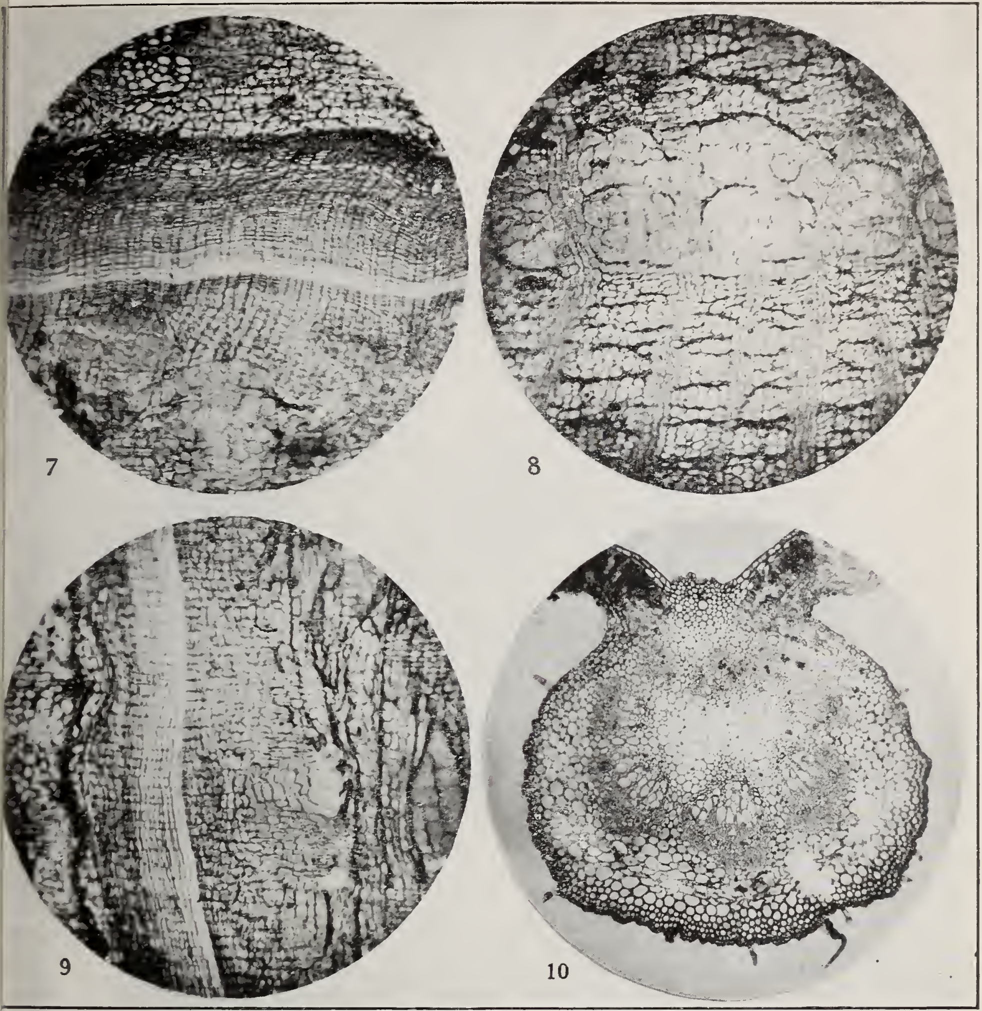


Fig. 8.—Sections of bark (7-9) and midrib (10) of *Gmelina Leichhardtii.* Reprinted with permission from the writer's paper in Proc. Linn. Soc., N.S.W., vol. 53. Photomicrographs: W. D. F.

7. Transverse section through the outer bark at the junction of the living and dead tissue. The light, undulating line towards the middle of the picture marks the separation or abscission area. Above the light line is the dead tissue. The periderm extends slightly below the light line and above for the distance of about 1 inch. Above the periderm is phloem parenchyma. Two large groups of sclerenchyma are shown in the lowermost and lower left parts of the picture. × 40.

8. Transverse section of the outer living bark inwards from the separation layer. In the portion from the middle towards the upper part are large groups of sclerenchyma with ill-defined cell boundaries. The irregular perpendicular series of cells are phloem rays. The dark irregular lines arranged transversely to the phloem rays in the lower part and appearing in the upper part above the sclerenchyma groups represent groups of collapsed sieve tubes. The numerous thin-walled cells constituting the ground tissue consist of parenchyma. × 40.

9. Longitudinal section of the bark at the junction of the outer dead bark and the inner living tissue. The tissues shown in 7 are seen in the longitudinal aspect in this picture. The outer dead bark commences at the light portion of the perpendicular band (periderm) and extends to the left of it. The dark irregular perpendicular lines on the right represent areas of collapsed sieve tubes. The lens-shaped area on the extreme right constitutes sclerenchyma. Smaller-celled sclerenchyma is shown below and to the right of the centre. × 40. (Explanation of 10 on p. 26.)

The writer has studied the structure of the bark in the White Beech (*Gmelina Leichhardtii*). In this species the bark is shed in rectangular or partly rounded scales (see Fig. 223). Photomicrographs 7, 8, and 9 in Fig. 8 show the minute structure of the bark in the White Beech.

The anatomical investigation shows that prominent longitudinal strands of thickened and hardened tissue (sclerenchyma) are not a feature of the bark of the White Beech. The absence of these longitudinal strands contributes to the scaly character of the bark as little resistance is offered to transverse fissuring during the drying of the outer dead bark.

THE WOOD OF AUSTRALIAN RAIN-FOREST TREES.

The rain forests contain trees which produce woods of a very wide range in texture, colour, and utility. Considered generally, the rain-forest woods are considerably softer than the woods produced by the majority of the species of *Eucalyptus* and *Acacia* which are dominant in so many of the drier forests of the Australian continent. The rain-forest woods, with very few exceptions, are also much less durable than those of the Eucalypts. Exemplification of this fact is rather strikingly exhibited in the progress of clearing rain forest. Felled rain forest, even after it has been burnt, has a formidable appearance, which is emphasised by its litter of logs and projecting stumps. But after the course of 4 or 5 years the agents of decay produce a very appreciable transformation: the majority of the logs and stumps have disappeared. A very different aspect is assumed in cleared Eucalyptus forests after a similar period; many of the logs and stumps persist after exposure for 15 or 20 years.

Among the very hard and heavy rain-forest woods which are comparable in these qualities with Eucalyptus woods are those of the Penda (*Xanthostemon oppositifolius*), Hauer (*Dissiliaria baloghioides*), *Geijera salicifolia*, and *Geijera Muelleri*. The Hauer is notable among rain-forest woods for its high durability, although it is not popular enough to become commercial. The Penda is of interest as an example of the circumstance that hardness and heaviness are not always criteria of durability. In the Noosa Shire (south and east of Gympie), where the Penda was very plentiful, it was used in the days of initial settlement for bridge building. It failed to fulfil the expectation of durability, and soon decayed.

Flindersia australis produces a wood of moderate hardness and considerable durability. It is a commercial wood of considerable repute.

Among the woods which are light and soft and yet durable are the Red Cedar (*Cedrela Toona* var. *australis*), White Beech (*Gmelina Leichhardtii*), and Rosewood (*Dysoxylum Fraseranum*).

The principal cabinet woods of Australia are from rain-forest trees. Included among them are the Queensland Maple (*Flindersia Brayleyana*), Silkwood (*Flindersia Pimenteliana*), the North Queensland Silky Oaks (*Cardwellia sublimis, Musgravea stenostachya, Darlingia spp.*), Queensland Walnut (*Endiandra Palmerstoni*), Black Bean (*Castanospermum australe*), Bolly Gum (*Litsea reticulata*), Southern Maple (*Cryptocarya erythroxylon*), Southern Silky Oak (*Grevillea robusta*). The Hoop Pine (*Araucaria Cunninghamii*), Bunya Pine (*Araucaria Bidwilli*), and Kauri Pine (*Agathis spp.*) are used in the interior of buildings for fittings and in cabinet work.

The use of rain-forest timbers in a general sense as softwoods is conditioned principally by the facility with which they can be worked by means of cutting tools, such as planes, chisels, and saws.

Examples of very soft woods are provided by the Stinging Trees (*Laportea gigas* and *Laportea photiniphylla*), the Queensland Bottle Tree and its allies (*Brachychiton spp.*), Bat's Wing Coral Tree (*Erythrina vespertilio*), and *Pisonia Brunoniana.*

The timber of the rain-forest species of the family Ebenaceae (including the genera *Maba* and *Diospyros*) frequently contains patches streaks, or specks of black wood (ebony).

The wood of some species is noticeable because of large or conspicuous rays. Instances are—Silky Oaks and their allies (*Grevillea spp., Stenocarpus spp., Orites excelsa, Cardwellia, Musgravea, Darlingia,* and other genera of the family Proteaceae), Churnwood (*Villaresia Moorei*), *Pennantia Cunninghamii,* Booyong (*Tarrietia Argyrodendron*), Black Jack (*Tarrietia actinophylla*), *Symplocos spp.*

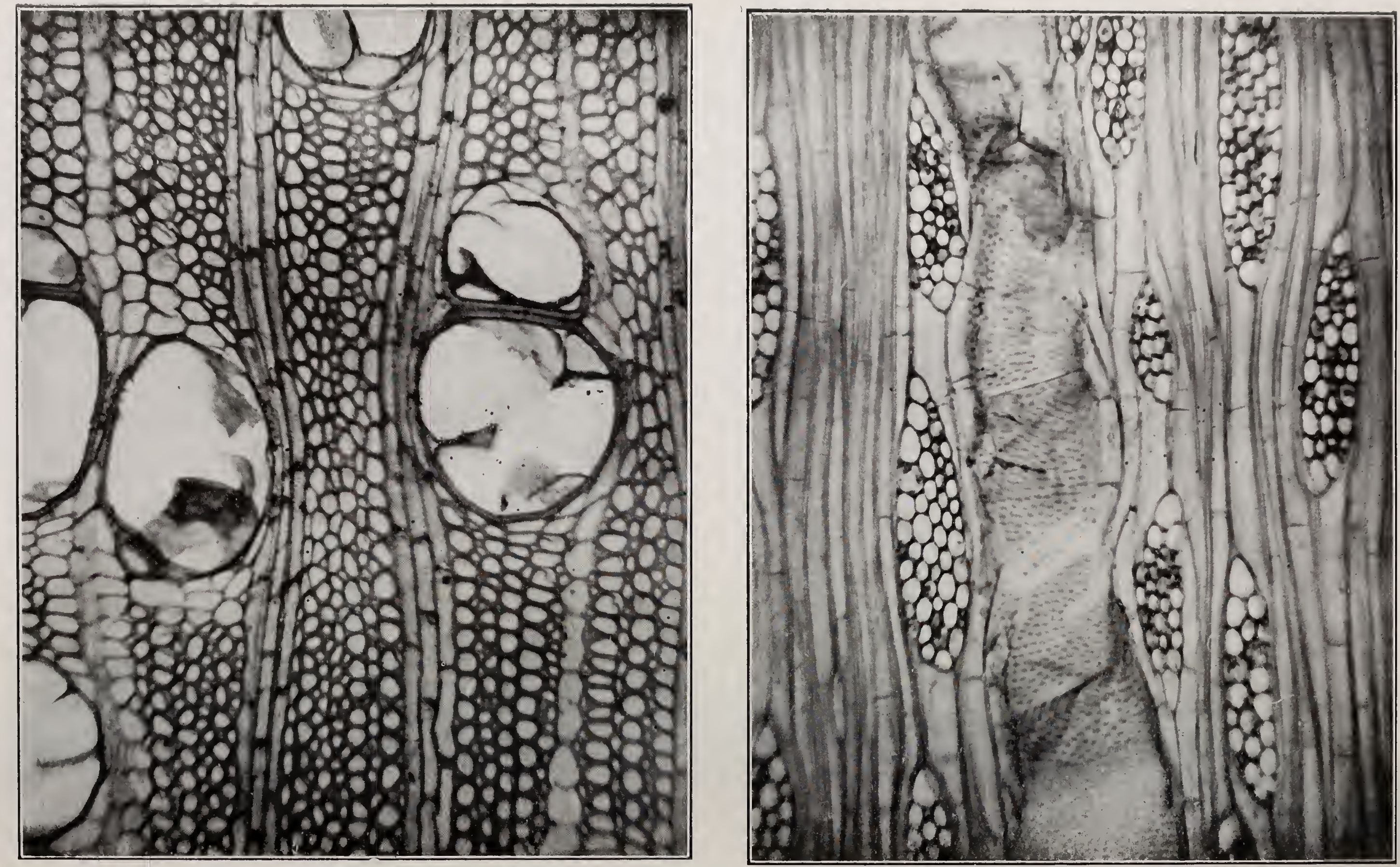
Some species are remarkable for the colour of their woods. Red or reddish woods are found in Red Cedar (*Cedrela Toona* var. *australis*), Rosewood (*Dysoxylum Fraseranum*), Red Bean (*Dysoxylum Muelleri* and *Dysoxylum sp.*), Scentless Rosewood (*Synoum glandulosum*), Crow's Apple (*Owenia venosa*), Red Ash (*Alphitonia Petriei*), Maiden's Blush (*Sloanea australis*), Cairns Pencil Cedar (*Lucuma galactoxylon*), Mackay Cedar (*Albizzia Toona*). Bright yellow woods often characterise Deep Yellow-wood (*Rhodosphaera rhodanthema*), Yellow Sassafras (*Doryphora sassafras*), *Daphnandra micrantha,* Sovereign Wood (*Terminalia spp.*). Dark-coloured heartwoods (when freshly cut) are conspicuous in Black Bean (*Castanospermum australe*), Hauer (*Dissiliaria baloghioides*), Lignum-Vitae (*Vitex Lignum-vitae*), Burdekin Plum (*Pleiogynium Solandri*). The dark-coloured wood is often in streaks in the heartwood of Tulip-wood (*Harpullia pendula*).

The wood of some species has a peculiar odour. That of Oliver's Sassafras (*Cinnamomum Oliveri*) has a strong smell of sassafras; that of Red Cedar (*Cedrela Toona* var. *australis*), Rosewood (*Dysoxylum Fraseranum*), and Incense Wood (*Amoora nitidula*) has an aroma like that of cedar oil, which is used for immersion lenses. The wood of Southern Maple (*Cryptocarya erythroxylon*) has a peculiar fruit-like smell.

The ash of some woods is distinctively coloured. That of Bonewood or Pinkheart (*Medicosma Cunninghamii*) is blue; that of Ironwood (*Myrtus Hillii ?*) is yellow.

In the wood of Red Cedar (*Cedrela Toona* var. *australis*) and White Cedar (*Melia Azedarach* var. *australasica*) the larger vessels are concentrated in concentric lines near the beginning of each growth ring. The conspicuous figure characteristic of the wood of these species is due to this periodic grouping of the vessels.

Very fine, but conspicuous, concentric rings of wood parenchyma (soft tissue) are evident in the wood of Rosewood (*Dysoxylum Fraseranum*), Red Bean (*Dysoxylum Muelleri*), and Spurwood (*Dysoxylum Pettigrewianum*). In the wood of species of *Notelaea* the wood parenchyma is peculiarly arranged. The cross sections show numerous small,



Figs. 9 and 10.—Wood of *Gmelina Leichhardtii.* Reprinted with permission from the writer's paper in Proc. Linn. Soc., N.S.W., vol. 53.
Explanation of figures in text. Photomicrographs: W. D. F

curved, and branched groups of wood parenchyma disposed obliquely to the radius of the stem.

The wood fibres are often or always septate in the wood of the White Beech (*Gmelina Leichhardtii*), Corduroy Tamarind (*Arytera Lautereriana*), Corduroy (*Sarcopteryx stipitata*), and Deep Yellow-wood (*Rhodosphæra rhodanthema*).

Explanation of Figs 9 and 10.—9. Transverse section of wood of large stem of *Gmelina Leichhardtii.* The large apertures represent the vessels in section. Projecting inwards from the walls of the vessels are tyloses. The elongated cells arranged in long lines from top to bottom of picture constitute the rays. The meshwork of small roundish apertures shows the wood fibres in section. X 120. Fig. 10. Tangential section of wood of large stem of *Gmelina Leichhardtii.* The broad, irregular band towards the middle of the picture shows a vessel in longitudinal section. The numerous spots on the vessel walls show the positions of the bordered pits. The two slightly oblique lines crossing the vessel are transverse walls. The irregular lines in the uppermost part of the vessel represent tyloses. A small amount of wood parenchyma is shown immediately surrounding the vessel in places. The large, lens-shaped areas with honeycomb-like pattern of ray cells in section are the rays in section. The long, wavy, dark lines passing from top to bottom are the walls of the fibres. The short lines at right angles to the fibre walls are septa which cross the lumina or cavities of the fibres. X. 120.

THE LEAVES OF AUSTRALIAN RAIN-FOREST TREES.

The rain forest on mountain slopes and hillsides can be distinguished at a distance of several miles from the adjoining Eucalyptus forests by the darker green colouring and much denser arrangement of the foliage of the rain-forest trees. The common species of *Eucalyptus* growing near rain forests generally have very narrow leaves with twisted stalks. The twisted stalks appear to act as a mechanism to evade exposure to sunlight of the flat or maximum surfaces of the leaf blades. This contrivance on the part of the plant has been interpreted as a means whereby excessive transpiration is checked. Associated with the ability of only exposing the minimum leaf surface to sunlight is the disposition of stomata or breathing pores on the surface of the leaves of many species of *Eucalyptus.* F. v. Mueller* records the interesting fact that the great majority of species of *Eucalyptus* have the stomata evenly distributed on both of the flat surfaces of the leaves.

In trees of the rain forests of a tropical character the very narrow leaves and the light-evading mechanisms, such as those of many species of *Eucalyptus*, are very rare. In all instances where microscopic sections have come under the writer's notice the stomata have been situated on the underside of the leaves of rain-forest trees. Very hard, rigid leaves are not very common in rain-forest species, but they do occur. A notable example is *Wilkiea* (*Kibara*) *macrophylla.* This shrub has very stiff, rigid leaves with sharply-toothed margins. *Akania Hillii*, a small tree, has very large pinnate leaves consisting of many large leaflets which are fairly rigid in texture and have pungently-toothed margins. Several of the rain-forest species of the family Proteaceae have hard, stiff leaves, which, on investigation, may be found to be apparently adapted to withstand dry conditions.

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* Mueller, F. Eucalyptographia 1879-1884.

McLuckie and Petrie* sectioned the leaves of several types of rain-forest trees growing in a mountain area, west from Sydney. The species thus treated were *Atherosperma moschatum, Doryphora sassafras, Ceratopetalum apetalum*, and *Quintinia Sieberi*. They found these species to have leaves with thin cuticles, little or no sclerenchyma, stomata flush with the epidermis, poorly developed palisade, and a great development of spongy mesophyll with large air spaces. The writer† investigated the leaf structure of *Gmelina Leichhardtii,* a tree of the luxuriant rain forests of Southern Queensland. He found anatomical features comparable with those described by McLuckie and Petrie. The palisade, however, is more strongly developed in *Gmelina* than in the southern species figured by McLuckie and Petrie. Text figures 5 to 9 in Fig. 11 illustrate the structure of the leaf of *Gmelina Leichhardtii.*

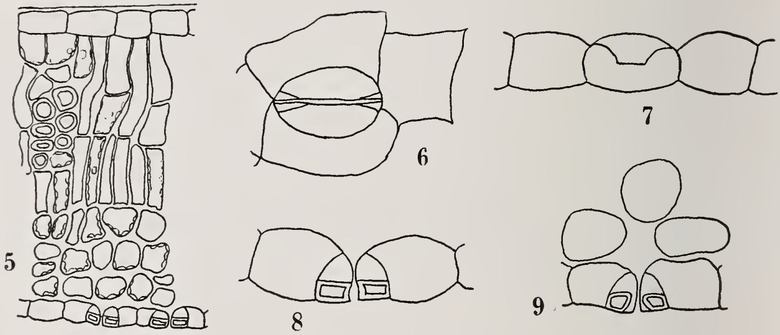

Fig. 11.—Sections of leaf of *Gmelina Leichhardtii.* 5. Part of a section through blade of leaf. The thickened cells on the upper left represent a small vascular bundle in section. In some of the cells the chloroplasts are shown as appressed to the cell walls. In a few cells the nuclei are outlined. X 222. 6. Stoma, surface view. X 700. 7. Stoma in longitudinal section. X 700. 8. Stoma, transverse section through middle. X 700. 9. Stoma, transverse section towards end. X 700.

Reprinted, with permission, from the writer's paper in Proc. Linn. Soc., N.S.W., vol. 53, 1928.

Photomicrograph 10 in Fig. 8 shows a transverse section of the midrib of the leaf of *Gmelina Leichhardtii.*

Several hairs are shown on the exterior of the midrib in the picture. The dark-walled and thick-walled cells beneath the epidermis (or external layer of cells) consist of strengthening tissue (collenchyma). The internal part of the midrib contains an irregular ring of about 8 vascular bundles. The outer side of each vascular bundle is hard, enclosed by hardened tissue (sclerenchyma) which is not shown in detail. The larger, irregularly seriate cells on the inner side of each vascular bundle constitute the woody portion (xylem). The minute dark-walled cells on the outer side of the xylem in each bundle form the phloem. The faint large circular cells in the centre of the midrib consist of parenchyma. The large cells between the vascular bundles and the collenchyma also consist of parenchyma. The magnification is 40 diameters.

With a few exceptions, Australian rain-forest trees are evergreen. The principal deciduous species are Red Cedar (*Cedrela Toona* var. *australis*) and White Cedar (*Melia Azedarach* var. *australasica*). These two species shed their leaves in winter and develop fresh ones in the spring months. Among the partly deciduous species are *Ficus Cunninghamii, Ehretia acuminata, Ficus gracilipes,* Flame Tree (*Brachychiton acerifolium*), *Brachychiton discolor, Pleiogynium Solandri* and perhaps *Albizzia Toona*. The White Beech (*Gmelina Leichhardtii*) sheds many, if not all of its leaves in November and December. Its young leaves appear at the end of November or early in December.

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*McLuckie, J., and A. H. Petrie. An Ecological Study of the Flora of Mount Wilson. Part IV. Proc. Linn. Soc., N.S.W., 52, 161, 1927.

† Francis, W. D. The Vegetative Anatomy of the Australian White Beech (*Gmelina Leichhardtii*). Proc. Linn. Soc., N.S.W., 53, 474, 1928.

The leaves of the rain-forest trees exhibit a great diversity in size and shape. Both simple and compound leaves are common. Lobed shapes and toothed margins also occur. The commonest form in Australian rain forests is the simple, entire leaf, placed alternately on the branchlet. An estimate of the distribution of the various leaf forms can be obtained from the material under the heading ''Artificial Subdivision of Australian Rain-Forest Trees to facilitate Identification'' which appears in this work.

Mr. Lane-Poole has drawn the writer's attention to the tender juvenile foliage of the rain-forest species, which, he remarks, seems to represent the only truly hygrophytic leaf in the tree flora of Australia. The very young leaves of *Bosistoa sapindiformis* are extremely membranous and brightly coloured. Many of the *Eugenias* have tender and highly coloured young shoots. Those of *Eugenia Luehmanni* are a remarkably bright reddish tint, and are often used for ornamental purposes by people living in localities where the species grows. The old leaves of *Elaeocarpus grandis* and of a few other species of *Elaeocarpus* turn a crimson colour before they fall away.

BRIEF DESCRIPTIONS OF THE FAMILIES.

These descriptions are intended to represent the families as they are constituted in the region covered by this work. The descriptions, therefore, are often restricted in their scope.

GYMNOSPERMS.

Family Podocarpaceae.—Leaves alternate, narrow, midrib alone visible. Parts of male flower consisting of minute sacs containing pollen, the sacs arranged in a cylindrical, spike-like structure (male flower). Fruit dark blue, consisting of a fleshy receptacle on which the globose seed is seated. One species (She Pine). (P. 42.)

Family Araucariaceae.—Leaves scale-like and spirally arranged in *Araucaria*: broad, flattened and finely longitudinally nerved in *Agathis*. Parts of male flower consisting of minute sacs containing pollen, the sacs placed under the apex of small scales which are arranged in a crowded, cylindrical spike-like structure (male flower). Fruit a cone. Hoop Pine, Bunya Pine, and Kauri Pine are included in this family. (P. 42.)

ANGIOSPERMS—MONOCOTYLEDONS.

Family Palmae.—Stems unbranched, more or less marked by the ring-like scars of fallen leaves. Leaves alternate, large and divided, segments longitudinally nerved. Envelope of flower (perianth) often arranged in series of 3 segments. (P. 55.)

ANGIOSPERMS—DICOTYLEDONS.

A.—Petals when present almost always separate and not united in a tube at base (in many Pittosporaceae and some Leguminosae Sub-family Mimosoideae the petals are more or less coherent at the base in a tube).

Family Fagaceae.—Leaves alternate, toothed. Flowers in forks of leaves. Male catkins consisting of a cup-shaped involucre enclosing 8–30 elliptical anthers on short stalks. Female catkins consisting of numerous bracts forming an egg-shaped body containing 3 female flowers. Includes Antarctic Beech and the true Beeches. (P. 55.)

Family Ulmaceae.—Leaves alternate, entire or toothed. Sexes in separate flowers. Perianth lobes 4–5. Stamens 4–5, opposite to perianth lobes. Fruit somewhat fleshy, egg-shaped, containing 1 seed. (P. 60.)

Family Moraceae.—Leaves alternate, entire or toothed. Green parts mostly containing milky juice. Sexes in separate flowers. Perianth lobes 3–6. Stamens of same number as perianth lobes and opposite to them or fewer. Fruit succulent. Includes the Fig trees and *Pseudomorus*. (P. 61.)

Family Urticaceae.—Leaves alternate, mostly toothed, often provided with stinging hairs. Sexes in separate flowers. Perianth mostly 4–5 lobed. Stamens 4–5, opposite perianth lobes. In the female flowers the perianth is often enlarged and succulent, and includes a single minute seed. Includes the Stinging Trees and *Pipturus* which is white on underside of leaf. Leaves sometimes entire (not toothed) in *Laportea photiniphylla*. (P. 71.)

Family Proteaceae.—Leaves alternate or much less frequently opposite or in whorls, simple, pinnate or divided, entire or toothed, sometimes rigid. Perianth mostly simple and most frequently consisting of 4 narrow lobes. Stamens most frequently 4 and situated opposite to or upon the perianth lobes. Ovary 1-celled or sometimes 2-celled. Fruit often hard and woody, splitting open on one side or succulent and remaining closed. Seeds 1 or several in each fruit. Includes the Silky Oaks and Bush Nut. (P. 76.)

Family Nyctaginaceae.—Leaves entire, alternate, opposite or irregularly grouped on the branchlets. Perianth simple, lower part tubular and enclosing ovary, the upper part obscurely lobed or toothed. Stamens 6–8; absent in female flowers. Fruit with 5 longitudinal ribs and containing a single seed. Fruit often exuding a dark sticky gum. Soft-wooded tree. (P. 91.)

Family PHYTOLACCACEAE.—Leaves alternate, entire. Perianth simple, of 5 more or less evident segments (obscure in the Australian rain-forest representative). Stamens in male flower 10 to 30. Fruit bell-shaped, consisting of 40–50 mutually compressed carpels. Small tree with pointed leaves. (P. 91.)

Family HIMANTANDRACEAE.—Leaves alternate, entire. Young branchlets and outer parts of flowers covered with copper-coloured scales (see also *Tarrietia*). Sepals 2, the outer one enclosing the inner one. Petals none. Stamens numerous. Fruit red, globose, containing several compressed seeds. Tree, the fruit and bark of which have a resinous smell. (P. 94.)

Family ANONACEAE.—Leaves alternate, entire. Flowers mostly with 3 calyx segments, 6 petals, and numerous stamens and carpels. The stamens are often small, narrow and wedge-shaped. Fruit consisting of several egg-shaped or globose, stalked, 1-seeded carpels which develop from one flower. One species. (P. 94.)

Family MONIMIACEAE.—Leaves opposite, often toothed. Perianth often globular, with 4 or more teeth or lobes arranged in 2 or more rows at its summit. Stamens of same number as perianth lobes (and opposite to them) or more. Carpels mostly several. Fruit consisting of several 1-seeded carpels, seated on the disk-like expanded perianth tube or included in the enlarged perianth tube. Some species with strongly aromatic barks. Includes some of the Australian Sassafrases.. (P. 94.)

Family LAURACEAE.—Leaves entire, alternate (opposite in *Cinnamomum* and sometimes approximated in groups in *Litsea*). Individual flowers mostly small. Perianth segments 6 or sometimes reduced to 4. Stamens 3, 6, 9, 12 or more, often accompanied by staminodia. Ovary free from perianth (or enclosed within it in *Cryptocarya*). Fruit mostly succulent, containing 1 seed, the remains of perianth at base (crowning the apex in *Cryptocarya*). Trees often large, bark often aromatic, wood fine-grained. Species of this family are often very abundant in the rain forests. Includes Bolly Gum and Oliver's Sassafras. (P. 100.)

Family HERNANDIACEAE.—Leaves alternate, entire. Male and female in separate flowers. Ultimate branches of inflorescence bearing at their summit 3–5 bracts enclosing or subtending 1–3 flowers. Each small flower surrounded at base by 2 or 3 small opposite bracteoles. Perianth lobes of male 7–8, of female 11–12. Stamens in male 4. Fruit enclosed in 2 or 3 large red bracts. Fruit black, egg-shaped, with about 10 longitudinal ribs. Species 1. (P. 123.)

Family CAPPARIDACEAE.—Leaves alternate, entire. Branchlets and stems often armed with prickles. Flowers large and white. Calyx lobes 4 (or 5), fleshy or hard outer ones enclosing inner ones. Petals 4 (or 5), white. Stamens numerous. Ovary raised on a conspicuous stalk. Fruit globose, hard, containing several seeds immersed in the firmi nterior. Species 1. Small tree with hard, dark bark and prickly stem. (P. 123.)

Family SAXIFRAGACEAE.—Leaves alternate (opposite or in whorls of 3 in *Polyosma*), margins toothed or entire. Calyx lobes 4–9. Petals as many as calyx lobes. Stamens as many as petals. Ovary inferior or superior. Fruit capsular (succulent in *Polyosma*). Seeds many or several (solitary in *Polyosma*) in each fruit. (P. 123.)

Family PITTOSPORACEAE.—Leaves entire or toothed, alternate or collected in irregular groups of 3–6. Flowers often conspicuous and fragrant. Calyx lobes or sepals mostly 5. Petals mostly 5, often conspicuous, the lower parts more or less cohering in a tube, the upper parts spreading. Stamens 5, alternating with petals. Fruit eventually splitting open into 2 or 3 valves; the valves bearing 1, 2, or numerous often sticky seeds on their upper or inner surface. Mostly small trees under 100 ft. high and 18 in. stem diameter. (P. 129.)

Family CUNONIACEAE.—Leaves opposite, simple or pinnate with 1–7 leaflets, margins of leaves or leaflets toothed. Calyx segments 5 or 4. Petals same number as calyx lobes (none in *Ceratopetalum apetalum* and *Callicoma*). Stamens twice as many as petals. Fruit capsular (indehiscent in *Ceratopetalum* and fleshy and indehiscent in *Schizomeria*), splitting open into 2–4 valves. Seeds 2 or many (only 1 in each fruit in *Ceratopetalum* and *Schizomeria*). Seeds minute and often hairy in *Weinmannia* and *Ackama*. Often large trees with buttressed stems. (P. 129.)

Family LEGUMINOSAE, Sub-family MIMOSOIDEAE.—Leaves alternate, doubly pinnate (reduced in many *Acacias* to the more or less flattened leaf-stalks and then known as phyllodes). Leaflets entire. Calyx of 5, 4, or 3 lobes or segments. Petals as many as calyx segments (connate at base into a tube in *Pithecolobium*). Stamens numerous, free (or united at base in *Pithecolobium* and some *Acacias*). Fruit a pod or bean. (P. 142.)

Family LEGUMINOSAE, Sub-family CAESALPINIODEAE.—Leaves alternate, mostly pinnate and consisting of several leaflets. Leaflets entire. Calyx lobes or segments 5 or 4. Petals as many as calyx segments, sometimes unequal in size and shape. Stamens 10 or reduced to as few as 2, sometimes unequal. Fruit a pod or bean. (P. 146.)

Family LEGUMINOSAE, Sub-family PAPILIONATAE.—Leaves alternate, simple or pinnate, and consisting of several leaflets. Calyx lobes or segments 5, or 4, 3, or 2. Petals mostly 5, unequal in size and shape, and in form resembling the flowers of the pea. Stamens mostly 10, free or united at base. Fruit a pod or bean. (P. 146.)

Family RUTACEAE.—Leaves opposite or alternate, simple or pinnate; margins of leaves or leaflets mostly entire, but sometimes slightly toothed. Almost without exception the leaves or leaflets contain small oil-glands which are generally visible when the leaf or leaflet is held up to the light. Calyx lobes or segments 4–5. Petals as many as calyx segments. Stamens as many or twice as many as petals (numerous in *Citrus*). Fruit capsular or succulent and indehiscent, containing 1 or several cells. Seeds mostly 1 or 2 in each cell of fruit. Small or large trees usually well represented in rain forests; several produce useful timber. (P. 152.)

Family SIMARUBACEAE.—Very closely allied to Rutaceae but the oil-glands of the leaves which generally characterise Rutaceae are lacking in Simarubaceae. The only representative of the family dealt with in this work is *Ailanthus malabarica*, which has alternate leaves with many leaflets. The fruit of this species consists of 1–5 strongly winged carpels. (P. 174.)

Family BURSERACEAE.—Leaves alternate, pinnate with several leaflets; leaflets entire. Calyx lobes or segments 3–5. Petals as many as calyx segments. Stamens twice as many or as many as petals. Fruit fleshy, containing 1–4 one-seeded cells. Species 1. Large tree with mango-scented bark and red flowers with 3 calyx lobes, 3 petals, and 6 stamens. (P. 175.)

Family MELIACEAE.—Leaves alternate, pinnate (twice pinnate in *Melia*), with several or many leaflets; leaflets entire (toothed or lobed in *Melia*). Calyx lobes or segments 4–6. Petals as many as calyx lobes. Stamens twice as many as petals (as many as petals in *Cedrela*), mostly united in a cup-shaped or cylindrical tube (free from base in *Cedrela*). Fruit capsular or indehiscent. Mostly large trees, often buttressed. Bark and wood sometimes fragrant or fœtid. Includes Red Cedar, White Cedar, and Rosewood. (P. 175.)

Family EUPHORBIACEAE.—Leaves mostly alternate (opposite in *Baloghia* and *Dissiliaria* and sometimes collected in groups in *Croton*), simple, margins entire or much less frequently toothed; sometimes there are 2 small glands at apex of leaf-stalks and occasionally as in *Mallotus* there are numerous minute glands on underside of leaves. Male and female parts in separate flowers. Calyx lobes or segments 5 or 3–6. Petals absent or as many as calyx segments. Stamens 3 or more, sometimes numerous and sometimes united at base. Fruit often 3-celled and 3-lobed, sometimes 2-lobed and 2-celled, or 4–9-lobed and as many celled, or fleshy and globose or ovoid with 1–3 cells. Seeds 1 or 2 in each cell, mostly attached at or towards apex of cell of fruit. (P. 196.)

Family ANACARDIACEAE.—Leaves alternate, pinnate with several leaflets. Calyx lobes or segments 5 or 4. Petals as many as calyx segments. Stamens twice as many as petals. Fruit indehiscent, fleshy or dry, 1-celled (cells 5–12 in *Pleiogynium*). Seeds mostly 1 in each cell of fruit. (P. 209.)

Family CELASTRACEAE.—Leaves alternate (opposite in *Elaeodendron*), prickly-toothed or entire. Calyx lobes or segments 5 or 4. Petals as many as calyx segments. Stamens as many as petals. Fruit capsular or indehiscent, 1–5-celled, and often opening in 2–5 valves, seeds 1 or several in each cell. In *Siphonodon* the fruit is indehiscent and contains several or numerous nutlets imbedded in a hard or granular pulp. When outer dead bark is removed an ochre or orange-coloured inner layer of bark is exposed in some species. (P. 214.)

Family ICACINACEAE.—Leaves alternate, entire. Calyx lobes or segments 5 or 4, small (minute in *Pennantia*). Petals as many as calyx lobes. Stamens as many as petals. Fruit fleshy, indehiscent, containing a single seed. Large trees. Wood fairly soft, with prominent rays. (P. 220.)

Family SAPINDACEAE.—Leaves mostly alternate, pinnate and consisting of 2 or more leaflets. Leaflets entire or toothed. Individual flowers frequently small. Calyx lobes or segments 5 or 3–6, mostly small. Petals mostly as many as calyx segments, sometimes absent ; in some genera there are scales or appendages attached to inner side of petals. Stamens mostly 8 (sometimes fewer in *Harpullia*), almost always situated on inner side of disk. Fruit 3-lobed, 2-lobed, or 1-lobed and containing as many cells as lobes, mostly splitting open and exposing the seeds. Seeds 1 or 2 in each cell of fruit. Sometimes large trees but much more frequently small ones. Wood mostly close-grained ; sometimes with a corrugated surface on sapwood beneath bark. (P. 222.)

Family AKANIACEAE.—Tree with large, alternate, pinnate leaves of several or numerous large, rigidly toothed leaflets. Calyx lobes 5. Petals 5. Stamens mostly 8. Disk absent. Fruit mostly 3-celled ; seeds 2 or 1 in each cell. Small tree, bark and green parts with turnip-like smell. (P. 238.)

Family RHAMNACEAE.—Leaves alternate or opposite, entire. Calyx lobes 5 or 4. Petals as many as calyx lobes, hood-shaped or concave. Stamens as many as petals, and each stamen opposite to and partly enclosed in each petal. Fruit somewhat succulent, 2–3-celled ; seed 1 in each cell. The fruit bears on its lower side the ring-like scar left by the calyx lobes. Species 2. (P. 238.)

Family ELAEOCARPACEAE.—Leaves alternate, margins generally toothed. In some species the leaves turn red with age. Calyx segments 4–5. Petals as many as calyx segments or sometimes absent. Stamens mostly numerous ; anthers mostly long and opening in a slit from the apex. Fruit succulent and enclosing a hard more or less wrinkled inner part which contains 1–5 one-seeded cells in *Elaeocarpus ;* capsular and bristly, 1–4-celled, 1–4-valved in *Sloanea*. Often buttressed trees. (P. 239.).

Family STERCULIACEAE.—Leaves alternate, simple or consisting of 2–9 leaflets radiating from apex of leaf-stalk, margins entire or lobed. Calyx often cup-shaped with 5 or 4 lobes. Petals as many as calyx lobes or none. Stamens numerous and united in a column at base (stamens 5, united in a very short cup and alternating with staminodia in threes in *Commersonia*). Fruit consisting of 1–5 boat-shaped, many-seeded carpels in *Brachychiton* and *Sterculia*, or of 1–5 single-seeded, prominently winged carpels in *Tarrietia*, or of a bristle-covered 5-valved capsule in *Commersonia*. Includes Booyong or Queensland Hickory, and the Bottle tree. (P. 258.)

Family FLACOURTIACEAE.—Leaves alternate, entire or somewhat angular or slightly lobed. Calyx lobes or segments 3–6. Petals as many as calyx segments. Stamens numerous. Fruit succulent, containing several angular seeds imbedded in pulp. Species 1. Tree ; sometimes with thorns in forks of leaves and occasionally with 1 or 2 angles in margin of leaf on each side of midrib. (P. 273.)

Family MYRTACEAE.—Leaves opposite (often alternate or in groups in *Tristania*), entire and always or mostly with oil-glands which are seen as minute transparent dots when the leaf is held up to the light. Calyx mostly above the ovary. Calyx lobes 4 or 5. Petals as many as calyx lobes. Stamens mostly numerous (united in bundles opposite to petals in *Tristania*). Fruit capsular and many-seeded, or succulent and 1- or several-seeded. The remains of the calyx often persist on the apex of fruit. In *Xanthostemon* the ovary is almost entirely superior and the remains of the calyx are situated near the base of the fruit. This family contains many large trees with close-grained wood. (P. 273.)

Family ARALIACEAE.—Leaves alternate, pinnate or doubly pinnate and consisting of several or numerous entire or sometimes lobed leaflets. Calyx united with the ovary, the upper part forming a slightly raised or slightly lobed ring at the summit of the combined calyx and ovary. Petals 5 or 4. Stamens as many as petals. Fruit mostly somewhat 2-lobed and 2-celled, bearing the calyx rim at or towards its apex. Fruit cells each containing 1 seed which is attached towards the top. Species 2. Trees with soft, pale wood. (P. 305.)

Family CORNACEAE.—Leaves alternate, entire, veins strongly raised on underside. Lower part of calyx united with ovary ; upper part free, cup-shaped. Petals 4–6. Stamens as many as petals. Fruit succulent, oval, containing 1 seed. Species 1. Tree up to 1 ft. stem diameter. Wood finely grained, yellowish. (P. 314.)

B.—Petals united at base into a tube and forming a corolla. In some species of Symplocaceae, Oleaceae, and Borraginaceae the union of the petals into a tube at the base is very slight and is sometimes almost imperceptible.

Family SAPOTACEAE.—Leaves alternate, entire. Bark very often with milky juice. Calyx segments 5 or 4–8. Petals united into a tube (corolla) at base and bearing at apex as many lobes as calyx segments. Stamens as many as corolla lobes and opposite to them. In addition to stamens, in some genera as *Sideroxylon* there are as many staminodia which alternate with the stamens. Fruit succulent, often black or dark blue, containing 1–5 seeds which are often hard and glossy. Includes the Black Apple or Black Plum. (P. 314.)

Family EBENACEAE.—Leaves alternate, entire, sometimes yellow and veinless on underside. Male and female organs usually in separate flowers and the sexes often on separate trees. Calyx lobes 3 or 4 or 5. Corolla lobes as many as calyx lobes. Stamens usually 10–20. Fruit succulent, containing a few seeds. Wood finely grained, often with patches or spots of black wood (ebony). The larger trees are very tall and slender. (P. 323.)

Family SYMPLOCACEAE.—Leaves alternate, toothed or entire, sometimes fairly thick and rigid, often turning yellow when dry. Calyx united with ovary ; upper part of calyx above ovary shortly 5-lobed. Corolla deeply divided into as many lobes as the calyx possesses. Stamens numerous. Fruit succulent, bearing the calyx lobes at apex, containing 2–5 cells ; each cell with 1 seed. Species 2. (P. 326.)

Family OLEACEAE.—Leaves opposite, entire. Calyx small, 4-lobed. Corolla deeply 4-lobed or consisting of 4 almost free petals which are somewhat united at the base by the stamens. Stamens 2, 1 on each side of the ovary. Fruit succulent, indehiscent, containing mostly a single seed. Species 2. The bark and sapwood often turn pink when exposed to the air. (This family includes the cultivated Olive.) (P. 326.)

Family LOGANIACEAE.—Leaves opposite, entire, with 1 or 2 longitudinal nerves on each side of midrib. Calyx lobes 4 or 5. Corolla tubular at base, the upper part bearing as many lobes as the calyx. Stamens as many as corolla lobes, alternate with them, and inserted in corolla tube. Fruit succulent, containing a single seed. Species 1. Wood characterised by white dots in cross-section and white lines in longitudinal section, in each case representing the sectioned parenchymatous tissue filled with crystals of calcium oxalate (R. T. Baker). (Strychnine is obtained from an Asiatic representative of this family.) (P. 327.)

Family APOCYNACEAE.—Leaves opposite, entire. Calyx lobes mostly 5. Corolla tubular at base, mostly 5-lobed in upper part. Stamens 5, inserted in corolla tube. Fruit consisting of 1 or 2 succulent, indehiscent carpels, each carpel mostly containing 1 large seed. Species 2. Generally small trees, sometimes green parts, bark, and pulp of fruit with milky juice. (P. 327.)

Family BORRAGINACEAE.—Leaves alternate, toothed or entire. Calyx small, 5-lobed. Corolla lobes 5, sometimes very slightly united at base. Stamens 5, inserted at base of corolla and alternating with its lobes. Fruit small succulent, the internal hard part consisting of 2 separable 2-celled and 2-seeded portions, or 4 one-celled and one-seeded portions. Species 2, one of which has a stem which is frequently grooved. (P. 332.)

Family VERBENACEAE.—Leaves opposite. entire and simple, or in *Vitex Lignum-vitae* sometimes slightly lobed and in *Vitex acuminata* consisting of 3 separate leaflets. Flowers often large. Calyx lobes 5 or 4. Corolla lobes 5 or 4, sometimes arranged in form of 2 lips ; lobes united below in a distinct, often large, tube. Stamens 4, sometimes arranged in pairs. Fruit succulent, containing a hard inner part divided into 4 or fewer cells, each cell with 1 seed. Includes large timber trees and small trees with large flowers. (The family comprises the Indian Teak and Australian White Beech.) (P. 332.)

Family SOLANACEAE.—Leaves alternate, entire. Calyx lobes 5. Corolla lobes 5, united in a white bell-shaped tube. Stamens 4, inserted on inner side of corolla tube. Fruit succulent, small, black, containing several or many small seeds. Species 1. Mostly small tree with pale, cork-like bark, soft leaves, and finely pitted seeds. (P. 337.)

Family RUBIACEAE.—Leaves opposite, or in whorls or groups of 3–4. Stipules often narrowly triangular and situated on stem between the insertion of the leaf-stalks of each pair of leaves ; if stipules have fallen away they mostly leave a mark on the stem between the leaf-stalks of each pair or group of leaves. Calyx united with ovary ; calyx lobes 4-5. Corolla lobes as many as calyx lobes. Stamens as many as corolla lobes and inserted in corolla tube. Fruit mostly succulent, cells 1–4, each containing 1 seed. Trees, sometimes with prominently corrugated sapwood. (P. 337.)

ARTIFICIAL SUBDIVISION OF AUSTRALIAN RAIN-FOREST TREES TO FACILITATE IDENTIFICATION.

In the following table the species of trees dealt with in this work are divided into groups. The groups are then subjected to subdivision into species, or in some cases into genera or families. The limitations of these genera and families are often restricted to the genera and families as they are represented in the region covered by this work. A similar qualification applies to the short descriptions of the families and to the generic keys.

THE DIVISION INTO GROUPS.

Leaves simple (not consisting of 2 or more leaflets).

Leaves arranged alternately on the branchlets.

Leaf margins mostly entire (not toothed or lobed).

Parts of male flower consisting of minute sacs containing pollen, the sacs arranged in a spike-like structure or under the apex of small scales which are arranged in a crowded spike-like structure .. .. Group 1.

Perianth or floral envelope simple or consisting of similar lobes or parts .. .. Group 2.

Perianth or floral envelope consisting of an outer and inner series of lobes, the lobes or parts of the inner series dissimilar in shape, size, or colour from those of the outer series.

Lobes of the inner series of perianth segments (petals) mostly free from each other .. .. Group 3.

Lobes of the inner series of perianth segments (petals) mostly united at base into a tube (which is exceedingly short in *Symplocos*) .. .. Group 4.

Leaf margins mostly toothed. Petals when present free or shortly united at base into a tube .. .. Group 5.

Leaves opposite on the branchlets.

Leaf margins mostly entire (not toothed or lobed).

Petals when present usually not united at base into a tube .. Group 6.

Petals mostly present and united at base into a tube. (The united portion of petals extremely short or petals united by the stamens only in Oleaceae) .. .. Group 7.

Leaf margins mostly toothed .. .. Group 8.

Leaves arranged in groups of 3–5 at ends of branchlets, or at intervals on the branchlets.

Leaf margins entire or toothed .. .. Group 9.

Leaves mostly simple and mostly alternate, the margins more or less deeply lobed or cut into segments .. .. Group 10.

Leaves pinnate or digitate consisting of 2 or more leaflets arranged on each side of an axis (pinnate) or placed at apex of leaf-stalk (digitate). To avoid confusion unifoliolate leaves are regarded as simple ones.

Leaves alternate or mostly alternate on the branchlets .. .. Group 11.

Leaves opposite or mostly opposite on the branchlets .. .. .. Group 12.

Leaves bipinnate, consisting of a primary axis which branches into secondary axes to which the leaflets are attached.

Leaves mostly alternate on the branchlets .. .. Group 13.

THE SUBDIVISION OF THE GROUPS.

Group 1.—Leaves simple, alternate, sometimes spirally arranged. Male elements of flower consisting of minute sacs containing pollen, the sacs arranged in a spike-like structure or under the apex of small scales which are arranged in a crowded, spike-like structure.

Fruit a cone.

Leaves broad and flattened, finely longitudinally nerved .. *Agathis robusta.*

Leaves lance-shaped, without prominent nerves, point sharp and spinous *Araucaria Bidwilli.*

Leaves small (under 1 in. long), narrowly triangular in shape *Araucaria Cunninghamii.*

Fruit consisting of a fleshy, plum-like receptacle bearing a single globose seed.

Leaves flat and narrow, midrib alone prominent .. .. *Podocarpus elata.*

Group 2.—Leaves simple, alternate; perianth or floral envelope simple or consisting of similar lobes or parts, not composed of outer and inner segments of a markedly dissimilar shape or colour. (Petals similar to calyx lobes but deciduous in *Scolopia*; calyx very minute in *Pennantia*; these are included in Group 3.)

Flowers minute, crowded on the inner surface of a fleshy receptacle called a fig; sexes in different flowers; perianth lobes 3–6; stamens 1, 2, or more in male flowers.

Trees whose living parts when broken mostly exude a milky juice .. *Ficus.*

Stamens of same number as perianth lobes and opposite to perianth lobes.

Flowers small, in small irregular groups (cymes) in the forks of the leaves. Fruit egg-shaped, black, $\frac{3}{8}$ in. long .. .. .. *Celtis paniculata.*

Flowers small; female perianth flask-shaped. Fruit a whitish fleshy mass. Leaves often with stinging hairs .. *Laportea photiniphylla.*

Flowers often conspicuous, arranged in slender racemes.

Fruit fleshy, oval, blue, about $\frac{1}{2}$ in. long, mostly with 1 seed .. *Helicia glabriflora.*

Fruit dry, globose, not splitting, $1\frac{1}{2}$–2 in. diameter, mostly with 2 seeds *Macadamia praealta.*

Fruit boat-shaped, splitting open on one side, mostly with 1 flattened seed .. .. *Orites excelsa.*

Flowers very conspicuous, arranged in dense groups (corymbs) or in symmetrical wheel-shaped groups (umbels); fruit boat-shaped or cylindrical, splitting on one side, with several flat seeds.

Flowers in dense groups (corymbs) at ends of branchlets .. .. *Embothrium Wickhamii* var. *pinnata.*

Flowers in symmetrical, wheel-shaped groups (umbels) .. *Stenocarpus.*

Perianth funnel-shaped, 5-angled or 5-toothed, enclosing the ovary; fruit narrow, up to $1\frac{1}{2}$ in. long, 4- or 5-angled and viscid *Pisonia Brunoniana.*

Perianth bell-shaped, obscurely toothed; fruit bell-shaped, consisting of 40–50 carpels .. .. *Codonocarpus australis.*

Perianth mostly 6-lobed, the lobes often forming an inner and outer series; flowers mostly under $\frac{1}{4}$ in. long.

Stamens 9, 6 outer ones opposite perianth lobes.

Ovary immersed in the perianth tube; fruit crowned by remains of perianth lobes .. .. *Cryptocarya.*

Ovary free from the perianth tube; fruit not crowned by remains of perianth lobes .. .. *Beilschmiedia.*

Stamens 3, situated towards centre of flower and often accompanied by staminodia and glands .. .. *Endiandra.*

Perianth 4–6-lobed; flowers enclosed in 4–6 concave bracts; fruit indehiscent, with 1 seed .. .. *Litsea.*

Perianth lobes 8–10, in 2 rows; stamens in male flowers 4; ovary inferior. Flowers and fruit surrounded by 3 bracts. Fruit black and longitudinally ribbed .. .. *Hernandia bivalvis.*

Perianth lobes 6 or 5, in 2 rows in male flowers; stamens 3–8, united in a central column. Fruit disc-shaped, 5–7-celled; seeds 1–2 in each cell .. .. *Glochidion.*

Perianth segments 4–5; stamens about 8 in male flowers. Fruit oval with a single seed grooved on one side .. .. *Hemicyclia australasica.*

Perianth opening in 3–5 segments, stamens in male flowers numerous, in centre of flower. Leaves often with 2 glands at base of blade and numerous minute glands on underside. Capsule mostly 3-lobed and 3-celled.

Capsule smooth or granular or covered with soft processes .. .. *Mallotus.*

Capsule furnished with a number of hard processes .. *Macaranga Tanarius.*

Perianth broadly cup-shaped in bud, nearly flat when expanded. Stamens in male flowers up to 6. Fruit 2-lobed .. .. *Homalanthus.*

Outer part of flower (calyx) bell-shaped, at least $\frac{3}{8}$ in. long. Stamens united in a central column. Wood soft.

Seeds smooth and black .. .. *Sterculia quadrifida.*

Seeds with a loose covering which often forms a honeycomb-like structure in the seed vessel .. .. *Brachychiton.*

Perianth consisting of 2 concave sepals, one enveloping the other. Stamens exceeding 15. Green parts marked by copper-coloured, minute scales .. .. *Himantandra.*

Group 3.—Leaves simple, alternate, mostly entire ; perianth or floral envelope consisting of an outer and inner series of lobes ; the lobes or parts of the inner series dissimilar in shape, size, or colour from the outer ones (as indicated by the presence of calyx lobes and petals).

Branchlets armed with spines situated in the leaf-forks. Stamens exceeding 15. (Spines often absent in *Scolopia*).

Leaves with minute transparent dots (glands) .. .. *Citrus.*

Flowers over 1 in. diameter when expanded .. .. *Capparis.*

Flowers $\frac{1}{4}$–$\frac{3}{8}$ in. diameter. Leaf margins often with 1 or 2 angles on each side .. .. *Scolopia Brownii.*

Stamens numerous (exceeding 15).

Stamens united into 5 large bundles, each bundle opposite a petal .. *Tristania.*

Stamens mostly free from each other (united at base in *Fontainea*).

Stamens narrowly wedge-shaped. Fruit of several stalked carpels *Polyalthia nitidissima.*

Individual flowers minute, arranged in small globose heads. Fruit a pod .. .. *Acacia.*

Calyx cup-shaped. Stamens united at base .. .. *Fontainea Pancheri.*

Stamens as many as petals (mostly 4–5) and mostly alternating with petals.

Ovary inferior (below the calyx). Upper part of calyx crowning the fruit.

Fruit opening at apex in small teeth or valves .. .. .. *Quintinia.*

Fruit fleshy and indehiscent, with a single seed .. .. .. *Marlea vitiensis.*

Leaves with minute transparent dots (oil-glands). Fruit of 1–5 separate parts, each part splitting open .. .. *Geijera.*

Disk (surrounding base of ovary) mostly prominent. Stamens borne on the disk or its margins.

Fruit splitting open into valves.

Fruit mostly 2-celled, mostly less than $\frac{5}{8}$ in. long .. .. .. *Celastrus.*

Fruit 3- or 4-celled, hard and woody .. .. *Denhamia pittosporoides*

Fruit 3–5-celled ; flowers deep red, often on stem or branches *Hedraianthera porphyropetala.*

Fruit indehiscent, globose, 1–2 in. diameter .. .. *Siphonodon australe.*

Petals much longer than calyx. Fruit egg-shaped, indehiscent, 1-seeded.

Calyx very minute ; petals nearly $\frac{1}{8}$ in. long .. *Pennantia Cunninghamii.*

Petals about $\frac{1}{8}$ in. long ; inner hard part of fruit forming a vertical furrow in the seed .. .. *Villaresia Moorei.*

Stamens as many as petals, which are hood-shaped and partly enclose the stamens. Fruit 2–3-celled ; seeds glossy, 1 in each cell.

Leaves pale or white on underside .. .. .. *Alphitonia Petriei.*

Leaves not white or grey on underside .. .. *Emmenosperma alphitonioides.*

Leaves with minute transparent dots (oil-glands). Petals 5 ; stamens 10 ; fruit fleshy, inner hard part 3–5-celled.

Fruit blue or reddish .. .. *Halfordia.*

Stamens mostly 10.

Flowers in large inflorescences at ends of branchlets. Leaves broadly heart-shaped. Fruit a pod .. .. .. *Barklya syringifolia.*

Stamens in male flowers mostly 5.

Flowers inconspicuous. Fruit globose, yellow, fleshy and indehiscent *Bridelia exaltata.*

Stamens 5–12 in male flowers. Leaves often with 2 small glands at apex of leaf-stalk.

Fruit mostly 3-lobed and 3-celled, eventually splitting open .. .. *Croton.*

Group 4.—Leaves simple, alternate, entire. Petals united at base into a tube thus forming a corolla (the tube exceedingly short or indistinct in *Symplocos*).

Bark mostly exuding a milky juice when cut (milky juice meagre in *Sideroxylon australe*). Flowers clustered or single in leaf-forks or on the branchlets.

Stamens 5, opposite corolla lobes ; staminodia or scales, when present, alternating with corolla lobes .. .. .. Family Sapotaceae.*

Calyx and corolla lobes 3–5 ; stamens mostly 10–20 in male flowers.

Wood often with black patches or black specks .. .. Family Ebenaceae.*

Stamens numerous (more than 10). Fruit crowned by remains of calyx lobes.

Flowers in simple or branched spikes or racemes .. .. *Symplocos.*

Stamens 5 or 4, alternating with the corolla lobes. Flowers small, arranged in a branching inflorescence (dichotomous cyme).

Fruit red, $\frac{1}{8}$–$\frac{1}{6}$ in. diameter, containing 4 cells .. .. *Ehretia membranifolia.*

Stamens 5 or 4, alternating with the corolla lobes. Flowers white, bell-shaped, $\frac{1}{4}$ in. long.

Fruit black, about $\frac{1}{4}$ in. diameter, fleshy .. .. .. *Duboisia myoporoides.*

Stamens 5 or 4, alternating with the petals which are often united towards the base.

Fruit splitting open into 2–5 pieces .. .. .. Family Pittosporaceae.*

Group 5.—Leaves simple, alternate, margins toothed.

Male flowers consisting of a 6–12-lobed concave involucre enclosing 8–30 stamens. Fruit enclosing about 3 one-seeded nuts, the outer part of the fruit (involucre) splitting into 4 parts .. .. *Fagus.*

Perianth or floral envelope consisting of similar lobes or segments, not composed of distinct calyx lobes and petals.

Flowers minute, crowded on the inner surface of a fleshy receptacle (fig.) ; leaves harsh to the touch .. .. .. *Ficus stephanocarpa.*

Stamens as many as perianth lobes and opposite to the perianth lobes.

Perianth lobes mostly 4–5.

Leaves harsh to the touch. Fruit indehiscent, 1-seeded.

Green parts and bark with milky juice .. *Pseudomorus Brunoniana.*

Green parts and bark without milky juice .. *Aphanantha philippinensis.*

Leaves with stinging hairs which are sometimes absent from large trees.

Perianth becoming fleshy in fruit. Fruit succulent and containing small nutlets .. .. *Laportea.*

Leaves white or pale on underside.

Flowers in clusters along spikes borne in leaf-forks *Pipturus argenteus.*

Flowers often conspicuous, arranged in slender racemes.

Fruit fleshy, bluish, about $\frac{1}{2}$ in. long .. .. *Helicia.*

Fruit boat-shaped, splitting open on one side, mostly with 1 flattened seed .. .. *Orites excelsa.*

Perianth segments 4–5 ; stamens about 8 in male flowers.

Fruit oval with a single seed grooved on one side .. *Hemicyclia australasica.*

Perianth lobes 3 or 2 ; stamens in male flowers 3 or 2 ; fruit 3-lobed and 3-celled.

Green parts exuding copious milky juice .. .. *Excaecaria Dallachyana.*

Perianth lobes 3–4 ; stamens more than 20 in male flowers. Flowers in racemes in leaf-forks.

Fruit consisting of 3 globose, 1-seeded lobes .. .. *Claoxylon australe.*

Perianth (calyx) lobes 4–5. Stamens numerous (over 15).

Fruit splitting into 2 woody, prickly valves .. .. .. *Sloanea Woollsii.*

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* Keys to the genera of these families are given in the text, and precede the descriptions of the species belonging to the families.

Perianth consisting of an inner and outer series of lobes, the lobes (petals) of the inner series dissimilar to those (calyx lobes) of the outer series. Petals not united in a tube at base.

Stamens as many as petals and mostly alternating with petals.

Disk surrounding base of ovary mostly prominent. Stamens borne on the disk or its margin.

Fruit splitting open into valves.

Fruit mostly 2-celled, mostly less than $\frac{5}{8}$ in. long .. *Celastrus bilocularis.*

Fruit 3- or 4-celled, hard and woody .. *Denhamia pittosporoides*

Calyx lobes 5–7, petals 5–7, and stamens 5–7.

Capsule egg-shaped, about $\frac{1}{8}$ in. long, opening at apex in 4–5 triangular teeth .. .. *Cuttsia viburnea.*

Calyx lobes 6–9, petals 6–9, and stamens 6–9.

Capsule fully $\frac{1}{2}$ in. long, opening from apex in 2 valves .. *Anopterus Macleayanus.*

Calyx lobes 5 ; petals 5 ; fruit yellow, pear-shaped. Fruit $\frac{3}{8}$ in. long, with 2–3 black seeds .. .. .. *Pittosporum rhombifolium.*

Calyx lobes 4–6 ; petals 4–6 ; stamens 5–8 in male flowers. Leaves often with 2 small glands at apex of stalk. Fruit 3-lobed and 3-celled.

Capsule mostly longer than broad .. .. *Croton acronychioides.*

Capsule mostly broader than long .. .. *Croton affinis.*

Calyx lobes mostly 5 ; petals mostly 5 ; stamens mostly 5, opposite the petals, placed below 5 triangular staminodia.

Capsule 5-valved, covered with long soft processes .. *Commersonia echinata.*

Calyx lobes 4–5 ; petals 4–5 ; stamens numerous (over 15).

Petals entire ; fruit opening in 2–4 valves .. .. *Sloanea australis.*

Petals entire or divided at apex ; fruit indehiscent, often blue and with a wrinkled, inner hard part .. .. *Elaeocarpus.*

Petals very shortly united at base to form a corolla. Calyx lobes 5 ; corolla lobes 5.

Stamens 5, alternating with corolla lobes. Fruit indehiscent, about $\frac{1}{4}$ in. diameter .. .. *Ehretia acuminata.*

Stamens numerous (more than 10). Fruit indehiscent, crowned by the calyx lobes .. .. *Symplocos.*

Group 6.—Leaves simple, opposite, margins entire. Petals, when present, usually not united at base to form a corolla.

Leaves finely longitudinally veined. Fruit a cone .. .. .. *Agathis robusta.*

Perianth tubular at base, lobes 8–10, arranged in 2 rows. Bark and green parts with sassafras odour ; leaves often pale on underside *Atherosperma moschatum.*

Perianth tubular at base, lobes 6. Fruit indehiscent. Bark with sassafras odour ; leaves with camphor odour .. .. .. *Cinnamomum.*

Perianth of 3–6 segments, inner ones sometimes petal-like. Fruit downy, splitting open into 6 parts .. .. *Dissiliaria.*

Calyx lobes 4–5 ; petals 4–5 ; stamens exceeding 10 in male flowers. Fruit slightly 3-lobed splitting open into 6 parts .. .. *Baloghia lucida.*

Calyx lobes 4–5 ; petals 4–5 ; stamens as many or twice as many as petals. Leaves with minute transparent dots.

Calyx lobes mostly 4, petals mostly 4, stamens mostly 4 (or 8).

Fruit white and fleshy, composed of 5–9 carpels, united at inner angle *Pleiococca Wilcoxiana.*

Calyx lobes mostly 4, petals mostly 4, stamens mostly 8.

Fruit composed of 1–4 cocci which split open.

Inflorescence composed of a few large flowers in the forks of the leaves .. .. *Medicosma Cunninghamii.*

Inflorescence composed of many flowers, mostly at ends of branchlets .. .. *Melicope melanophloia.*

Fruit indehiscent, often succulent .. .. *Acronychia.*

Calyx lobes mostly 5; petals mostly 5; stamens mostly 10.

Fruit composed of 1–5 carpels, each carpel splitting into 2 valves *Pagetia.*

Calyx lobes 4–5; petals 4–5; stamens 4–5, alternating with petals.

Fruit indehiscent, outer part fleshy, inner part hard, containing 1–3 cells *Elaeodendron.*

Calyx lobes mostly 5, petals mostly 5; stamens mostly 5, opposite to petals and partly enclosed in petals.

Fruit splitting open; seeds glossy, sometimes remaining attached to flower-stalk .. .. .. *Emmenosperma alphitonioides.*

Calyx lobes 4–5; petals 4–5; stamens mostly numerous (over 10). Ovary surrounded by calyx and remains of calyx crowning the fruit except in *Xanthostemon.*

Leaves mostly with minute transparent dots .. Family Myrtaceae (except *Tristania conferta* and *T. laurina*).

Group 7.—Leaves simple, opposite, entire (not toothed or lobed). Petals always present and united at base to form a corolla. The lower, united position of the corolla sometimes extremely short or only united by the stamens in the Family Oleaceae.

Calyx small and 4-toothed, petals or corolla lobes 4; stamens 2. Fruit succulent, containing mostly 1 seed.

Petals 4, often united in pairs by the stamens .. .. *Notelaea.*

Petals 4, united at base into a very short tube .. .. .. *Olea paniculata.*

Calyx lobes 4–6; corolla tubular at base, upper part 4–6-lobed.

Fruit consisting of 1 or 2 red, egg-shaped succulent carpels often containing a milky juice .. .. *Ochrosia.*

Calyx lobes mostly 5; corolla tubular, often very long and slender, upper part mostly 5-lobed. Stamens 4, often projecting much beyond the corolla.

Fruit dark when ripe, seated in the enlarged cup-shaped calyx .. *Clerodendron.*

Calyx broadly bell-shaped; corolla large, bell-shaped at base; stamens 4, arranged in pairs.

Fruit globose, blue, succulent, inner hard part 4-celled .. *Gmelina Leichhardtii.*

Calyx small, almost without lobes; corolla bell-shaped and curved; stamens 4, in pairs.

Fruit globose, red, succulent, inner hard part 4-celled .. *Vitex Lignum-vitae.*

Calyx small, 4- or 5-lobed at apex, lower part surrounding the ovary; upper part crowning fruit.

Corolla tubular at base, upper part 4- or 5-lobed; stamens as many as corolla lobes and alternating with them .. Family Rubiaceae.

Group 8.—Leaves simple (not consisting of 2 or more leaflets), opposite, margins toothed.

Perianth nearly globular, the small orifice almost closed by 4 minute broad lobes. Stamens 8–14 in male flowers.

Fruit consisting of a disk on which are seated several egg-shaped, indehiscent, 1-seeded carpels .. .. .. *Wilkiea Huegeliana.*

Perianth with a bell-shaped lower part, the upper part with 6–10 lobes in 2 rows. Fruit consisting of many narrow hairy carpels enclosed in the enlarged perianth tube.

Perianth lobes 6, stamens 6; staminodia 6–12. Bark with strong odour of sassafras .. .. *Doryphora sassafras.*

Perianth lobes 8 or rarely 10; stamens about 12 in male flowers. Bark and green parts with strong odour of sassafras *Atherosperma moschatum.*

Perianth tube short, segments about 15 in about 3 rows; stamens 4–5. Fruit consisting of several slender hairy carpels enclosed in the enlarged perianth .. .. .. *Daphnandra micrantha.*
Calyx tube enclosing the ovary; calyx lobes 4, small, crowning the fruit; petals 4, cohering in a tube; stamens 4.
  Fruit egg-shaped, black, fluted, up to $\frac{3}{4}$ in. long .. *Polyosma Cunninghamii.*
Calyx lobes 5; petals 5; stamens 10.
  Fruit globose or egg-shaped, fleshy, white, acid to taste, hard inner part 2-celled .. .. *Schizomeria ovata.*
Calyx lobes 5 or 4; petals absent; stamens 10 or 8.
  Fruit egg-shaped, 2-celled, about $\frac{1}{8}$ in. across. Surrounded at base by the calyx; calyx lobes enlarging to $\frac{3}{8}$ in. long in fruit .. *Ceratopetalum apetalum.*
Calyx lobes 4 or 5; petals absent; stamens 8–15. Flowers in dense globose heads. Fruit small, separating into 2 or 3 carpels.
  Leaves often white on underside .. .. *Callicoma serratifolia.*
Calyx of 3–4 broad segments; petals 3–4, slightly longer than calyx.
  Fruit 3-lobed, splitting open into 3 or 6 parts .. .. *Dissiliaria Muelleri* (?).
Calyx lobes 4–5; petals 4–5; stamens 4–5, alternating with petals. Fruit indehiscent; outer part fleshy; inner part hard, containing 1–3 cells .. .. *Elaeodendron.*

Group 9.—Leaves simple, entire or with toothed margins, arranged in groups of 3–5 at ends of branchlets or at intervals on the branchlets.

Leaves with entire margins (toothed in *Pittosporum rhombifolium*).
  Leaves closely longitudinally nerved. Fruit a cone .. .. *Agathis robusta.*
  Perianth funnel-shaped, 5-angled or 5-toothed enclosing the ovary; fruit narrow, up to $1\frac{1}{2}$ in. long, 4- or 5-angled and viscid *Pisonia Brunoniana.*
  Leaves white or pale on underside.
    Perianth 4-lobed; flowers enclosed in 4–6 concave bracts. Fruit indehiscent, 1-seeded .. .. *Litsea dealbata.*
  Calyx lobes 5; petals 5, often united in a tube at base; stamens 5, alternating with petals; fruit bursting open into 2–5 parts *Pittosporum.*
  Leaves often with 2 small glands at apex of stalks, young shoots and underside of leaves silvery. Fruit 3-lobed .. .. *Croton insularis.*
  Stamens numerous, united in 5 large bundles situated opposite to the petals .. .. *Tristania conferta.*
Leaves with toothed or sometimes entire margins.
  Flowers arranged in slender racemes, perianth lobes 4; stamens 4, opposite perianth lobes. Outer part of fruit splitting and exposing a round hard nut .. *Macadamia* except *M. praealta.*

Group 10.—Leaves simple, mostly alternate, margins more or less deeply lobed or cut into segments.

Leaves very rough to the touch; flowers minute, crowded on the inside of a fleshy receptacle; fruit a fig .. .. *Ficus stenocarpa.*
Flowers in slender racemes or spikes; perianth lobes mostly 4, mostly narrow, sometimes curved and sometimes more or less coherent; stamens mostly 4 and situated opposite to or on the perianth lobes.
  Leaves often over 1 ft. long, very deeply divided into many leaflet-like segments; segments with toothed margins. Fruit red, oval, about $1\frac{1}{2}$ in. long, 1-seeded .. .. *Hicksbeachia pinnatifolia.*
  Leaves white and silky on underside. Fruit hard and flattened, egg-shaped, about 1 in. long, splitting on one side, 1-seeded .. *Grevillea Hilliana.*
  Leaves often white or pale on underside. Fruit boat-shaped, splitting on one side, 1-seeded .. .. *Orites excelsa.*
Flowers red, very conspicuous, arranged in symmetrical wheel-shaped groups (umbels). Fruit splitting open, containing several or numerous flat seeds .. .. *Stenocarpus sinuatus.*
Calyx bell-shaped; stamens united in a column. Fruit consisting of 1–5 boat-shaped carpels containing numerous seeds .. *Brachychiton.*

Group 11.—Leaves pinnate or digitate, consisting of 2 or more leaflets arranged on each side of an axis (pinnate) or placed at apex of leaf-stalk (digitate). Leaves alternate. (To avoid confusion unifoliolate leaves are regarded as simple ones.)

Leaves pinnate, consisting of 2 or more leaflets arranged on each side of an axis.

Branches and sometimes the stem and leaf-axis armed with prickles.

Leaves consisting of 5–13 leaflets .. .. .. *Zanthoxylum brachyacanthum.*

Leaves consisting of 3 leaflets .. .. *Erythrina vespertilio.*

Perianth segments 4, usually narrow ; stamens 4, opposite to or placed upon the perianth segments.

Flowers in slender racemes, conspicuous.

Leaflet-like segments of leaves with toothed margins ; fruit red, oval, about $1\frac{1}{2}$ in. long .. .. .. *Hicksbeachia pinnatifolia.*

Leaves silky on underside ; leaf segments lobed. Fruit splitting open on one side ; seed winged .. .. *Grevillea robusta.*

Flowers crowded towards ends of branchlets, conspicuous. Fruit almost cylindrical, 3–4 in. long, splitting open and exposing the flattened seeds which are arranged in 2 series .. *Embothrium Wickhamii* var. *pinnata.*

Calyx bell-shaped or 5-lobed ; petals 5, very unequal or nearly regular ; stamens 10 or 7. Fruit a very large or a long pod.

Leaflets 8–17 ; flowers over $\frac{3}{4}$ in. long, red to yellow *Castanospermum australe.*

Leaflets 6–12 ; flowers under $\frac{3}{4}$ in. ; pod 8–17 in. long .. .. *Cassia Brewsteri.*

Leaflets 5 or more but sometimes reduced to 3, containing minute transparent dots.

Calyx lobes mostly 5, petals mostly 5, stamens mostly 10. Fruit indehiscent.

Fruit consisting of 1–5 free carpels which are expanded into a membranous wing .. .. *Pentaceras australis.*

Fruit succulent, egg-shaped, containing 2 or 1 seed .. *Micromelum pubescens.*

Calyx lobes mostly 5, petals mostly 5, stamens mostly 5, often alternating with 5 staminodia.

Fruit consisting of 5 hard, woody, boat-shaped pieces united at base *Flindersia australis.*

Leaflets 9 or more, mostly numerous ; leaves very long. Calyx lobes mostly 5 or inconspicuous ; petals mostly 5.

Stamens mostly 10 ; fruit of 1–5 winged, 1-seeded carpels *Ailanthus imberbiflora.*

Stamens mostly 5 ; calyx tube united with and surrounding the ovary ; fruit 2- (or 3-) lobed .. .. *Panax Murrayi.*

Leaflets 12–30, margins prickly-toothed ; calyx lobes 5, petals 5, stamens 5–10, mostly 8.

Capsule mostly 3-celled, cells with 2 or 1 seed .. .. .. *Akania Hillii.*

Leaflets 3–5. Calyx lobes 3–4 ; petals 3–4, red ; stamens mostly 6.

Fruit oval, the hard inner part with 2–4 cells .. .. *Protium australasicum.*

Calyx segments mostly 4–5 ; petals mostly 4–5 ; stamens as many or twice as many as petals, united in a cylindrical or cup-shaped tube except in *Cedrela* which has 5 free stamens Family Meliaceae.*

Calyx segments mostly 4–5 ; petals 4–5, sometimes absent ; stamens mostly 8, inserted round the ovary within the disk.

Fruit often 3- or 2-lobed or reduced to 1 lobe ; seeds mostly 1 or 2 in each cell of fruit .. .. Family Sapindaceae.*

Calyx segments mostly 5 ; petals mostly 5 ; stamens mostly 10. Fruit indehiscent, containing 1 seed or in *Pleiogynium* up to 12 seeds .. .. Family Anacardiaceae.*

Leaves digitate, consisting of 2–9 leaflets radiating from the apex of the leaf-stalk.

Calyx broadly bell-shaped, 5-lobed ; petals absent ; stamens in male flowers united in a column .. .. *Tarrietia.*

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* Keys to the genera of these families are given in the descriptive portion and precede the descriptions of the species.

Group 12.—Leaves pinnate or digitate, consisting of 2 or more leaflets arranged on each side of the leaf axis (pinnate) or attached at apex of leaf-stalk (digitate). Leaves opposite on the stem.

Leaves pinnate consisting of 2 or more leaflets arranged on each side of an axis. Petals mostly free and not united into a tubular corolla at base.

Leaflets 3–7, margins toothed.

Calyx lobes 5–4 ; stamens twice as many as calyx lobes. Fruit dry and splitting open, containing 2–3 cells.

Leaflets usually 5, sometimes 7 ; petals mostly 5.

Capsule globose, under ¼ in. diameter. Seeds with long hairs .. *Ackama paniculata.*

Leaflets usually 3 ; petals absent or quickly falling away.

Capsule egg-shaped, under ¼ in. long without the long hairs covering it. Seeds angular or egg-shaped. .. *Weinmannia lachnocarpa.*

Capsule almost cylindrical, over ½ in. long. Seeds flattened .. *Geissois Benthamii.*

Leaflets mostly 3, margins mostly entire ; minute transparent dots usually present in leaflets.

Calyx lobes 5, petals 5, stamens 10, Fruit of 1–5 carpels which split open.

Stalks of leaves ½–⅝ in. long .. .. *Bosistoa transversa.*

Stalks of leaves ¼–⅞ in. long .. .. *Pagetia monostylis.*

Calyx lobes 4–5, petals 4–5, stamens 8–10.

Fruit of 1–5 carpels which split open .. .. *Melicope.*

Fruit white and fleshy, mostly 4-lobed .. *Acronychia melicopoides* var. *lasiantha*.

Calyx lobes 4–5, petals 4–5, stamens 4–5.

Fruit of 1–5 carpels which split open .. .. *Evodia.*

Leaflets 3–7, mostly with transparent dots ; calyx lobes 5 ; petals 5 ; stamens 10.

Fruit of 1–5 free carpels which split open .. .. *Bosistoa sapindiformis.*

Leaflets 5–11, sometimes reduced to 3 or exceeding 11, mostly with transparent dots.

Calyx lobes mostly 5 ; petals mostly 5 ; stamens mostly 5, often alternating with 5 staminodia.

Fruit consisting of 5 hard, boat-shaped pieces which separate or are united at base .. .. *Flindersia.*

Leaves digitate, consisting of 2–5 leaflets radiating from the apex of leaf-stalk.

Petals free and not united at base into a tubular corolla. Calyx lobes 5, petals 5, stamens 10. Fruit of 2–5 carpels each of which splits open .. .. *Bosistoa.*

Petals united at base into a tubular or bell-shaped corolla. Stamens 4, in pairs. Fruit globose, red, succulent, inner hard part 4-celled *Vitex acuminata.*

Group 13.*—Leaves bipinnate, consisting of a primary axis which branches into secondary axes to which the leaflets are attached. Sometimes the secondary axes are branched to form a tripinnate leaf. Leaves mostly alternate on the stem.

Calyx united with the ovary ; calyx rim circular, scarcely lobed. Petals mostly 5, stamens 5, alternating with petals. Fruit 2- (or 3-) lobed .. .. *Panax elegans.*

Calyx bell-shaped or tubular ; petals united at base into a tubular or bell-shaped corolla, the upper part 5- or 4-lobed and often splitting ; stamens slender, over 50. Fruit a pod .. .. *Pithecolobium.*

Calyx 5- or 6-lobed ; petals 5–6 ; stamens 10–12 united into a tube. Fruit succulent, egg-shaped ; inner hard part with 1–5 cells .. *Melia Azedarach* var. *australasica.*

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* The rain-forest Acacias in the seedling stage have bipinnate leaves. Mostly in the adult stage the leaf is represented by the leaf-like, expanded leaf stalk (phyllode). The rain-forest Acacias are included in Group 3.

DESCRIPTIONS AND ILLUSTRATIONS OF THE SPECIES.

Family PODOCARPACEAE.

Podocarpus elata R.Br.—She Pine, Brown Pine, Yellow Pine. Figs. 12 and 13.

Derivation.—Podocarpus from Greek *pous, podos,* a foot; *karpos,* fruit (alluding to the fleshy foot-stalk of the fruit); Latin *elata,* tall (referring to the height of the tree).

Description.—A large tree attaining 130 ft. in height and a stem diameter of 3 ft. Stem not prominently buttressed but sometimes irregularly or spirally fluted or channelled. Bark brown or dark brown, finely fissured on large trees; when cut reddish brown, flesh-coloured or white towards sapwood, measuring $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. Leaves alternate, on a very short stalk. Leaf-blade narrow, point sharp and spinous, upper surface glossy, midrib alone prominent; measurement of leaf-blade, $1\frac{1}{2}$–7 in. long and 4–9 times as long as broad. Male and female flowers on separate trees. Male flowers spike-like, $\frac{1}{2}$–1 in. long and arranged in clusters of 2–10 situated on the branchlets in the forks (axils) of the leaves or above the scars of fallen leaves. The male flowers consist of minute crowded sacs (anthers) measuring about $\frac{1}{48}$ in. diameter and containing 2 cells filled with pollen. Female flowers single on stalks in the forks (axils) of the leaves or arising from above the scars of fallen leaves. The female flowers bear at the apex 3 triangular lobes or scales, 2 of which bear an ovule on their inner sides. Fruit on a short stalk about $\frac{1}{10}$ in. long. The fruit consists of a fleshy, bluish-black, plum-like receptacle attaining almost 1 in. diameter and bearing at its apex a globular seed of about $\frac{1}{3}$–$\frac{1}{2}$ in. diameter. Flowering period: October.

Distribution.—Common in the scrubs of coastal Eastern Australia from Illawarra, N.S.W. (J. H. Maiden), to Cairns, North Queensland.

Uses.—The timber is useful for general indoor work. Large numbers of the trees have been destroyed in the felling of the scrubs.

Reference.—*Podocarpus elata* R. Brown ex Mirbel in Memoires du Museum, d'Histoire Naturelle, Paris, vol. 13, p. 75, 1825.

Family ARAUCARIACEAE.

Leaves broad and flattened, mostly over $\frac{1}{2}$ in. broad, not pungent-pointed. Seeds borne on upper side of cone-scales and not united with cone-scales	1. *Agathis.*
Leaves scale-like and thick, or flattened and pungent-pointed, mostly under $\frac{1}{2}$ in. broad. Seeds united with the cone-scales	2. *Araucaria.*

1. AGATHIS.

Agathis robusta F.M.B. Kauri Pine, Dundathu Pine, South Queensland Kauri Pine, Queensland Kauri. Figs. 14 and 15.

Derivation.—Agathis probably from Greek *agathis,* a ball of thread (possibly alluding to the resemblance of the cone to a ball of thread or twine); Latin *robusta,* strong or robust (indicating the vigorous growth of the tree).

Description.—A very large, symmetrical tree attaining 160 ft. in total height with a stem length up to 90 ft. below branches and a maximum stem diameter of 8 ft. Stem almost cylindrical, not flanged. Bark brown, somewhat scaly with small rounded flakes of partly shed outer bark. When the bark is cut it is seen to be brownish red in colour and measures $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. Wood almost white. Branchlets smooth and green. Leaf-stalk scarcely distinct. Leaves mostly opposite. Leaf-blades narrowly elliptical in outline, narrowed at both ends, upper surface dark green, under surface paler, the only veins visible are fine, close, indistinct, parallel ones running the length of the leaf; measurement of leaf-blade, 2–4 in. long, 3–5 times as long as broad; seedling and coppice (" sucker") leaves are generally much broader than leaves on adult trees. Male and female flowers frequently borne on the same tree. Male flowers spike-like, 2–4 in. long and about $\frac{3}{10}$ in. diameter, composed of closely packed scales or anthers about $\frac{1}{8}$ in. long bearing beneath their summits 6–7 narrow cells almost $\frac{1}{8}$ in. long containing pollen. The male flowers are borne in the forks (axils) of the leaves and are subtended at the base by 8–12 concave, overlapping bracts about $\frac{3}{10}$ in. in breadth. Female flowers composed of numerous overlapping carpels. Each carpel bears on its upper face an ovule. The female flowers mature into the fruiting cone, which is ovoid in shape and attains 5 in. in length. The cone-scales or carpels are comparatively thin in texture, roughly triangular in shape,

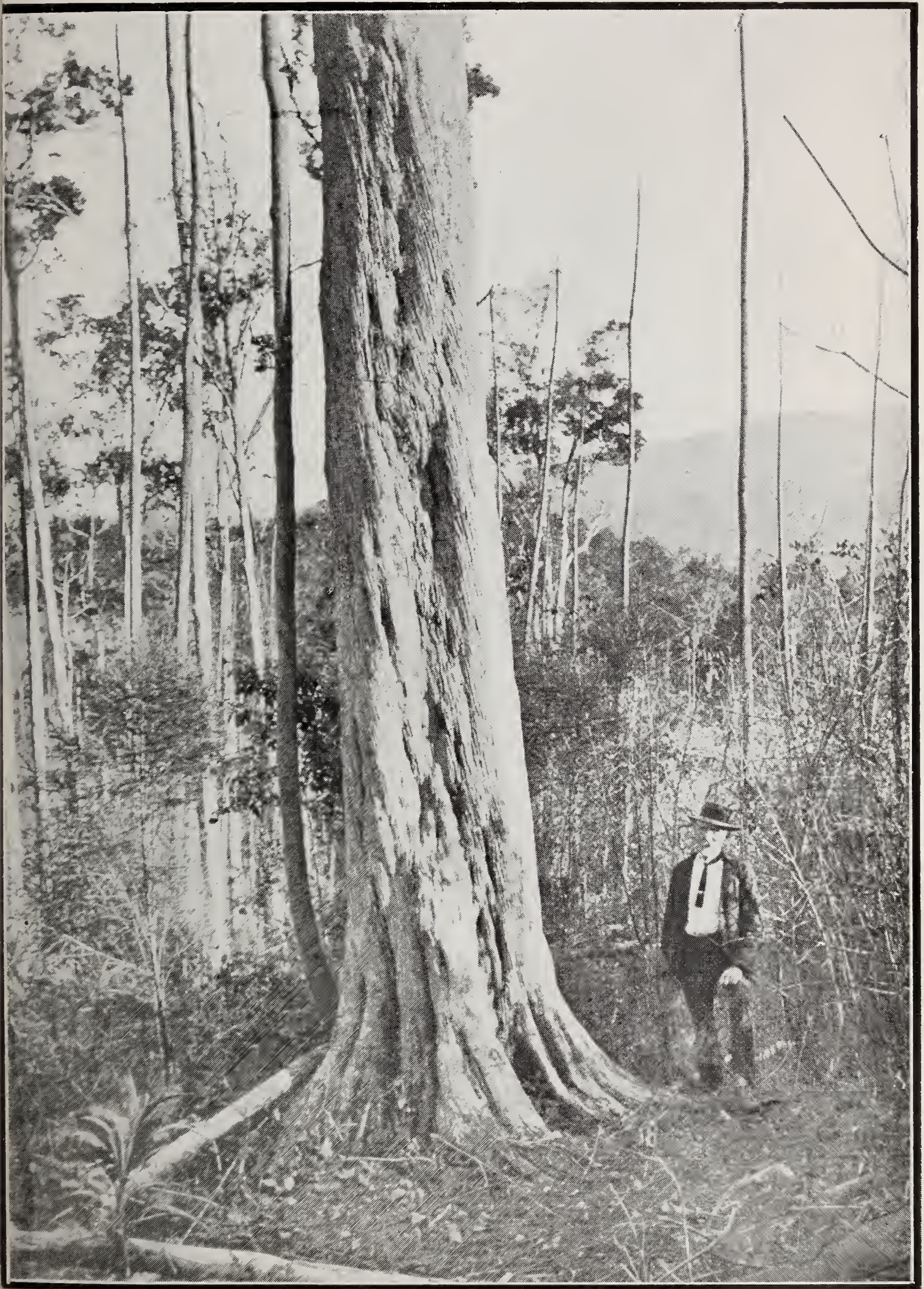

Fig. 12.—She Pine (*Podocarpus elata*). Kin Kin, about 26.2° S.
(*Photo.: W. D. F.*)

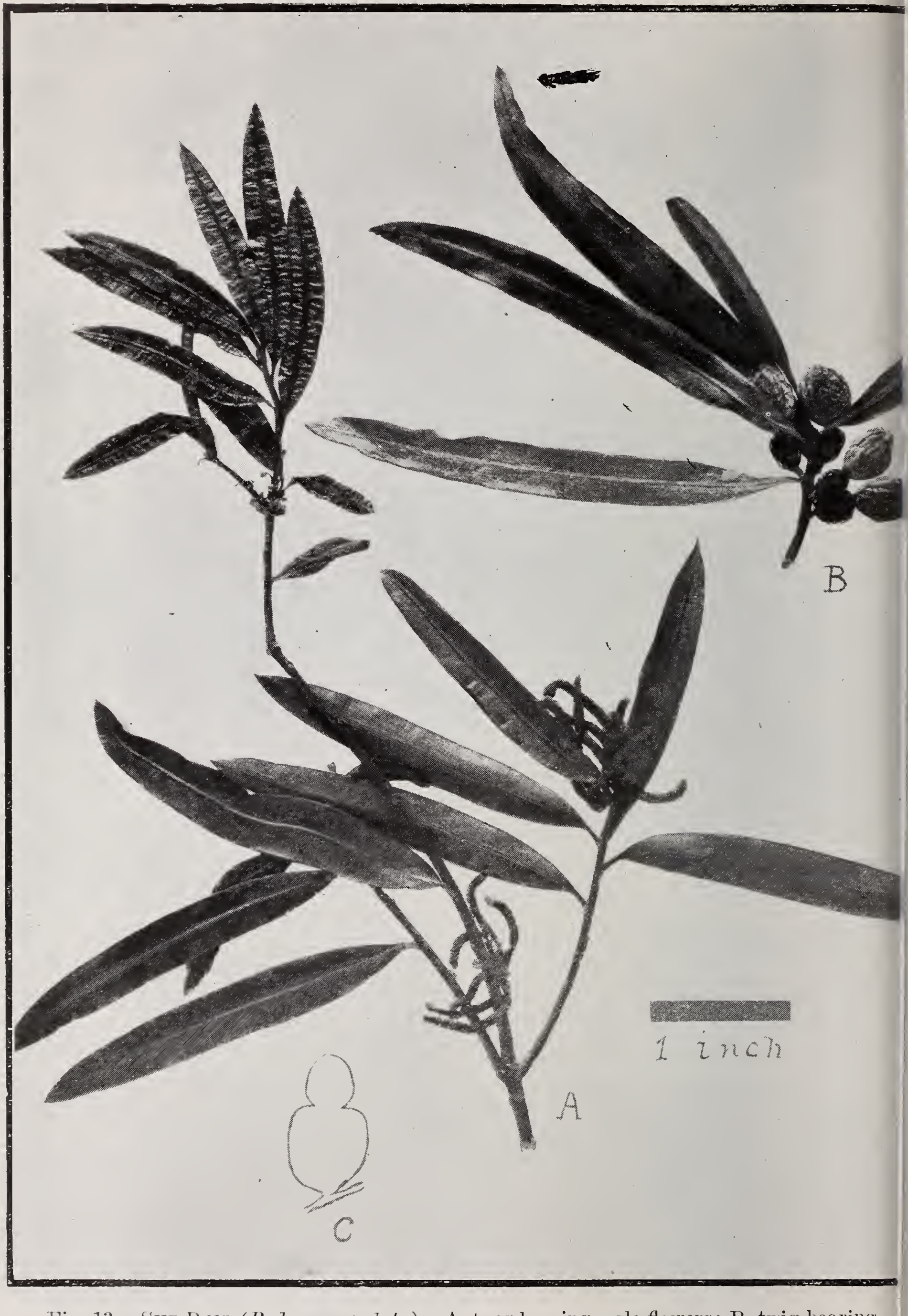

Fig. 13.—SHE PINE (*Podocarpus elata*). A, twig bearing male flowers; B, twig bearing dry fruit; C, outline of shape of fruit.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

and measure about 1½ in. in breath. The seeds when they are developed are placed on the upper surfaces of the cone-scales. The seeds consist of a solid part, egg-shaped in outline, and measuring about ½ in. long and bearing at the outer end a thin wing about 1 in. long. The seed wing is generally developed only on one side. Flowering period about August. The seeds are mature in January and February and are not fertile every year.

Distribution.—Confined to a limited area of Southern Queensland scrub from Tewantin on the south to Maryborough on the north. Also found on Fraser Island. The majority of the mainland trees have been felled.

Uses.—The timber is probably the most handsome of the Australian Araucarian coniferous woods. It was used for lining and indoor fittings and cabinet work. The trees are often planted for ornamental purposes. They are characterised by the fact that they develop a long stem even in the open.

References.—*Agathis robusta* F. M. Bailey, Catalogue of Woods of Queensland (Lond. Col. Ind. Exhib. 1886), 83 ; *Dammara robusta* C. Moore in Transactions Pharmaceutical Society of Victoria, ii., 174, 1860. The first reference is copied from the Index Kewensis, Suppl. 1, and the second reference from F. v. Mueller's Second Systematic Census of Australian Plants.

2. ARAUCARIA.

Araucaria Cunninghamii Ait. Hoop Pine, Colonial Pine, Queensland Pine. Figs. 16 and 17.

Derivation.—Araucaria from the Chilian name " Araucanos" for *Araucaria imbricata* ; Cunninghamii, after Allan Cunningham.

Description.—A very tall, symmetrical tree. Stem almost cylindrical, not flanged, attaining a height of 160 ft. and 5 ft. in stem diameter. Sometimes the stem below the branches attains a length of 90 ft. Bark very dark brown or nearly black, rough and marked by transverse wrinkles or fissures. When the bark is cut it is seen to be reddish brown in colour and measures 1 in. thick on a tree with a stem diameter of 1 ft. 3 in. Wood almost white. The seedling and coppice ("sucker") leaves are longer, flatter, and much sharper than the leaves on adult trees. Leaves crowded on the branchlets, without stalks, curved, very narrow or narrowly triangular in shape, narrowed at the apex into a more or less rigid or sharp point ; measurement of leaf ¼–⅓ in. long. Male and female flowers generally on separate trees. Male flowers growing out from the ends of branchlets and consisting of narrow spike-like structures 1½–3 in. long ; each flower bears crowded scales or anthers about ⅛ in. long. On the underside of the expanded apex of each scale or anther are attached 3 or more narrow cells containing pollen. The female flowers develop at the ends of branchlets and are composed of crowded carpels, the lowermost of which are similar to the leaves. On the inner side of each carpel and combined with it at the base is a ligular scale which contains an ovule. The female flowers develop into the fruiting cones which are oval or nearly globular in shape and measure 2–4 in. long. The cones are composed of numerous crowded and flattened scales about 1 in. long. Each cone-scale consists of a carpel and ligular scale combined and is winged at the sides. The seeds when they are developed are combined with the ligular scales on the upper side of the cone-scales. Flowering period : male flowers were observed on the trees in November and January.

Distribution.—Coastal scrubs from the Hastings River, N.S.W. (J. H. Maiden), to North Queensland. In places as far inland as 100 miles. Mountain ranges of New Guinea (Lane-Poole).

Remarks.—A glaucous (bluish-white) form of the species is very common on the islands of the Whitsunday Passage and northwards, where stunted trees of the glaucous form grow almost to the water's edge (C. T. White).

Uses.—The timber is the most extensively used of all the coniferous woods of Eastern Australia. It is used on a large scale for butter boxes, lining, flooring, indoor fittings, and the less expensive kinds of cabinet work. The trees are frequently cultivated for their ornamental appearance. They are conical or narrowly pyramidal in shape and have a pleasing, symmetrical form.

Reference.—*Araucaria Cunninghamii* Aiton in Sweet Hort. Brit., 475.

Araucaria Bidwilli W. J. Hooker.—Bunya Pine, Bunya Bunya, Queensland Pine. Figs. 18 and 19.

Derivation.—Araucaria from the Chilian name "Araucanos" for *Araucaria imbricata* ; Bidwilli, after John Carne Bidwill.

Description.—A large symmetrical tree attaining 140 ft. in height and a stem diameter of 5 ft. ; the unbranched stems sometimes attain a length of 80 ft. Stem

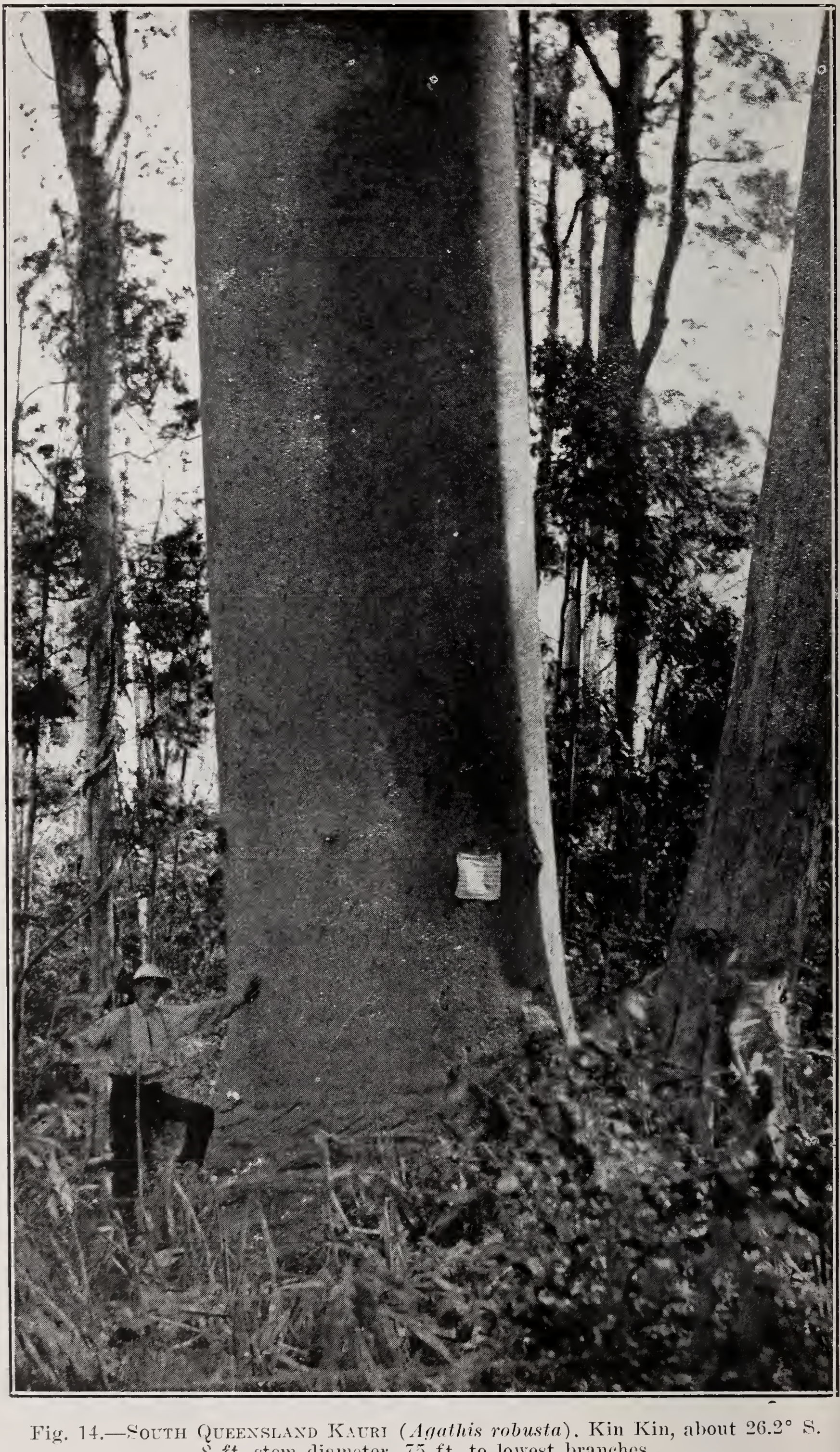

Fig. 14.—South Queensland Kauri (*Agathis robusta*). Kin Kin, about 26.2° S. 8 ft. stem diameter, 75 ft. to lowest branches.

(*Photo.: W. D. F.*)

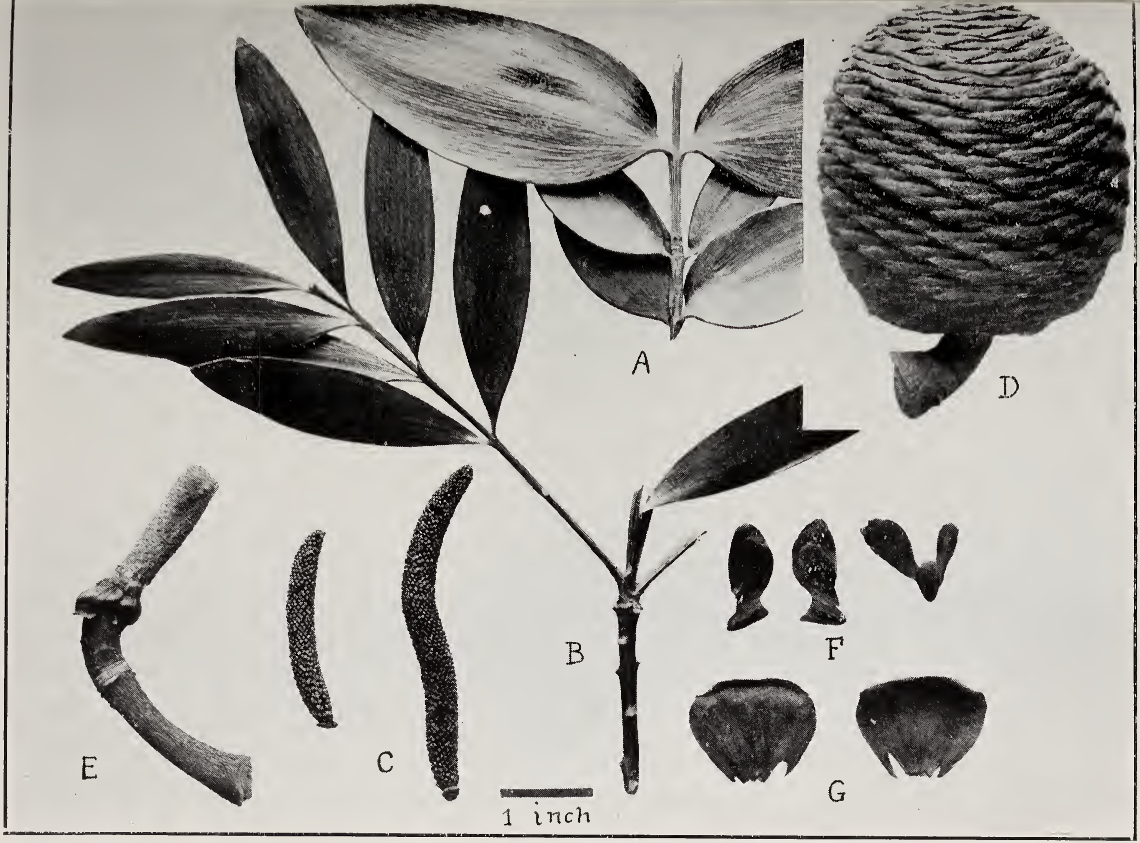

Fig. 15.—South Queensland Kauri (*Agathis robusta*).—A, coppice shoot; B, shoot from mature tree; C, male flowers; D, cone; E, axis of cone; F, seeds; G, cone scales.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

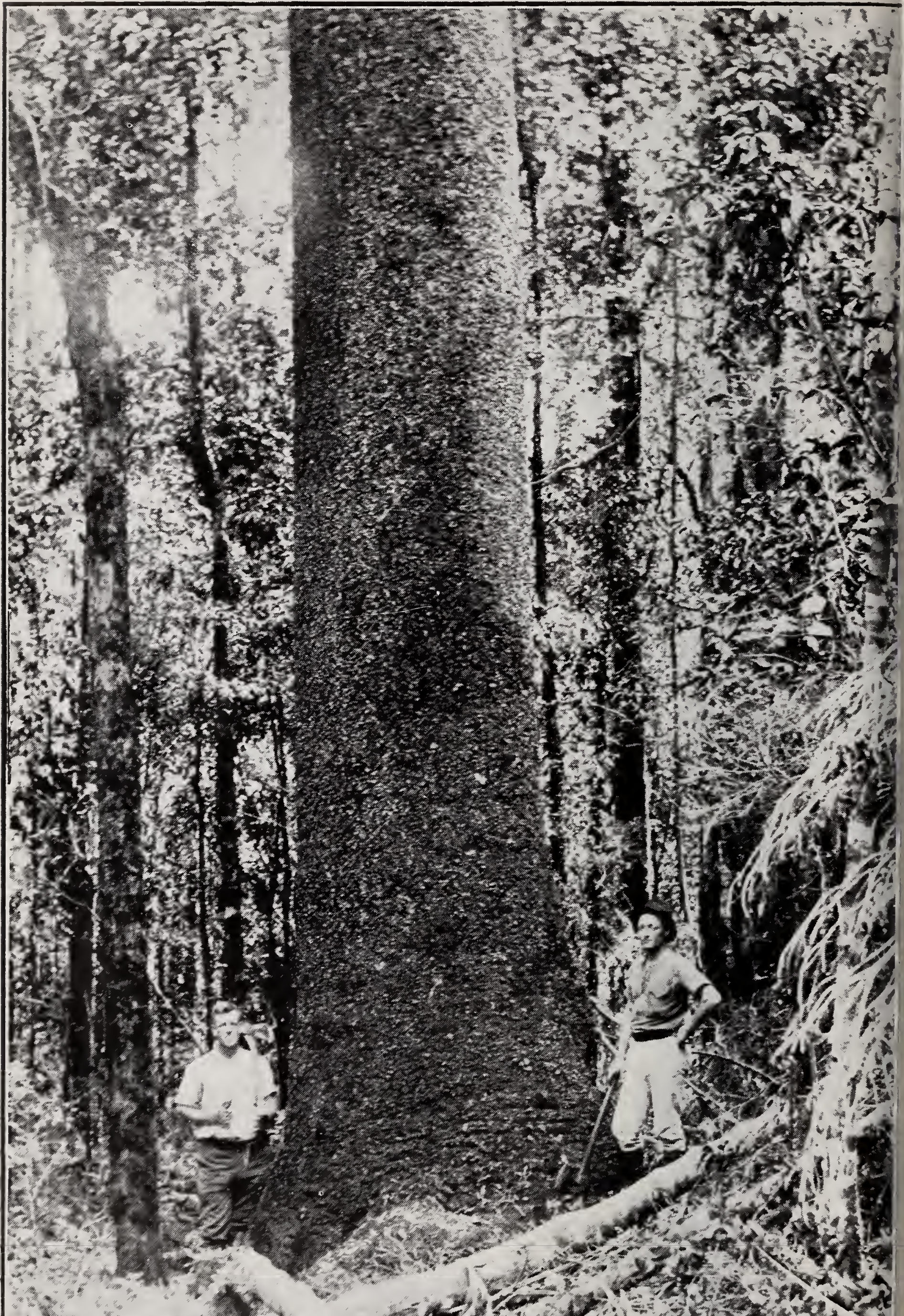

Fig. 16.—Hoop Pine (*Araucaria Cunninghamii*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

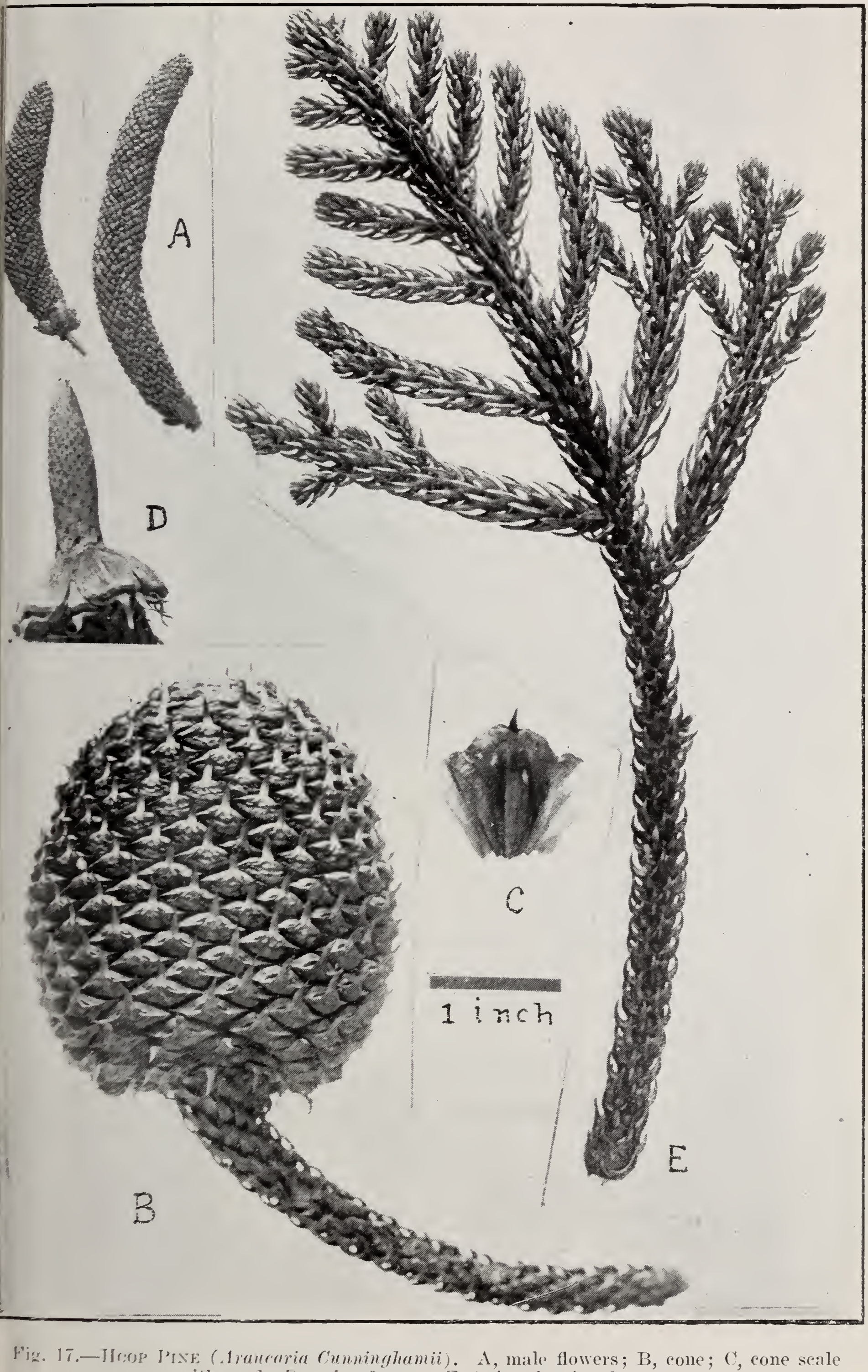

Fig. 17.—HOOP PINE (*Araucaria Cunninghamii*). A, male flowers; B, cone; C, cone scale with seed; D, axis of cone; E, twig, showing leaves.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

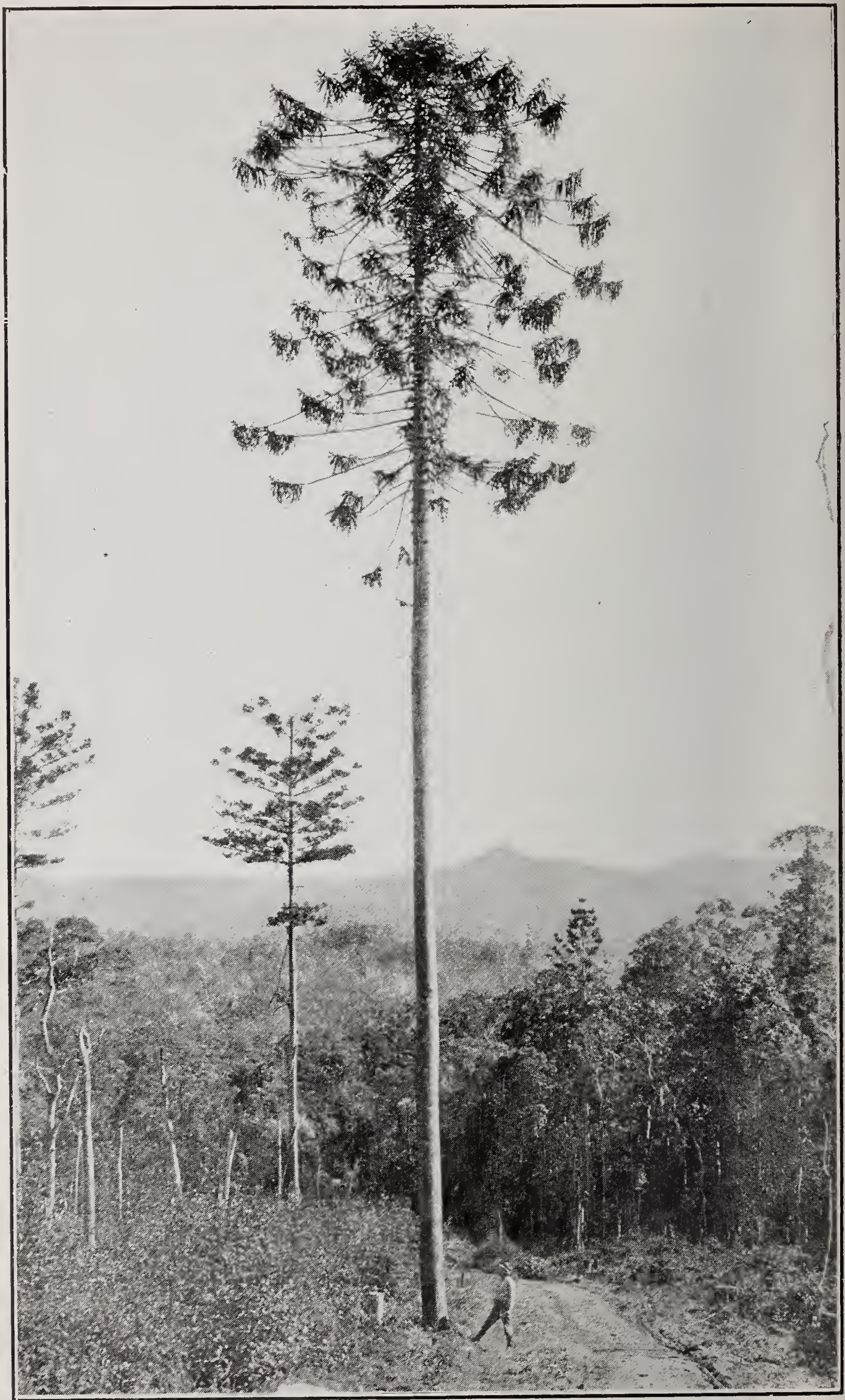

Fig. 18.—Bunya Pine (*Araucaria Bidwilli*). Imbil, about 26.4° S. Hoop Pine in background on left.

(*Photo.: E. H. Wilson, of Arnold Aborctum.*

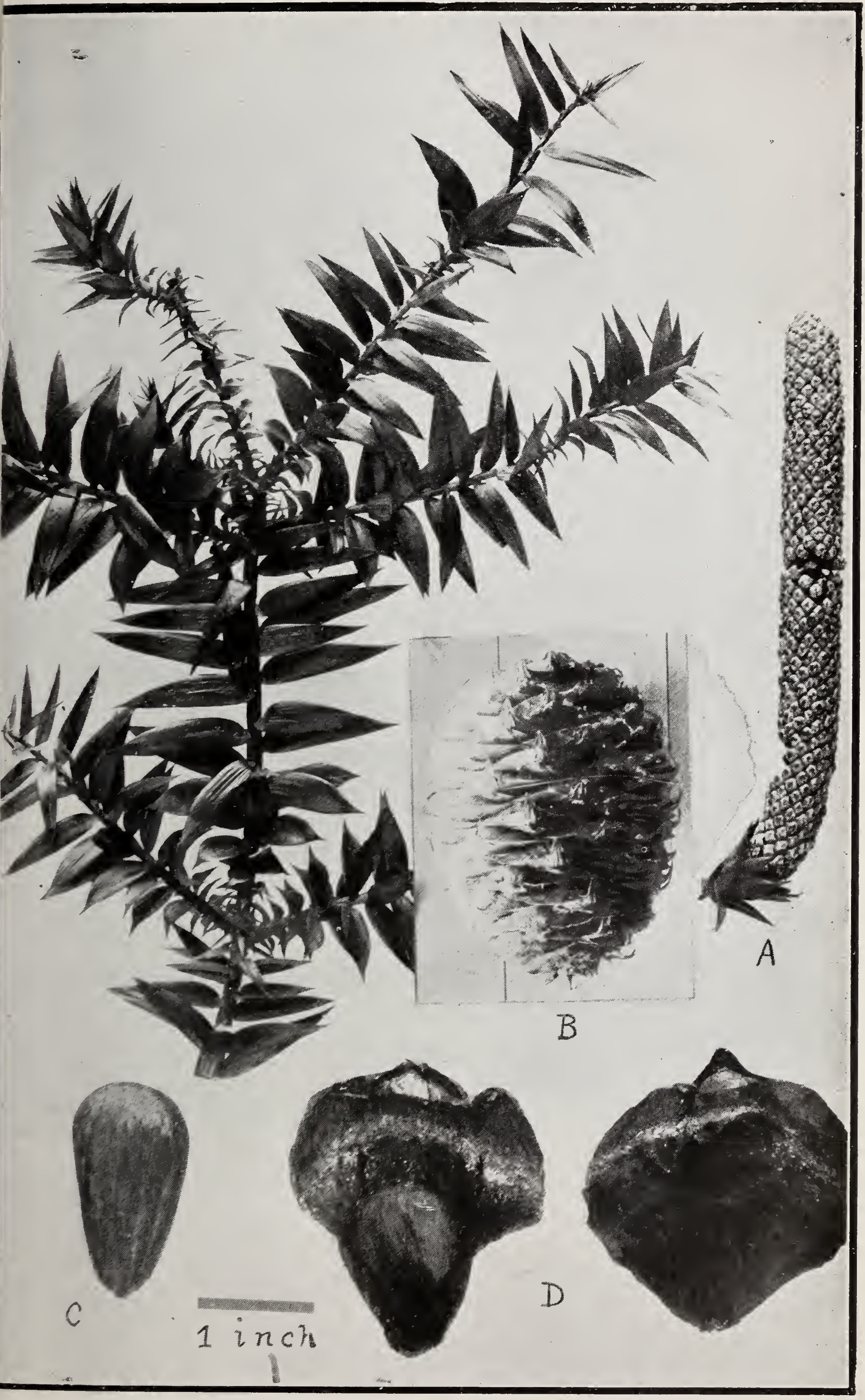

Fig. 19.—Bunya Pine (*Araucaria Bidwilli*). A, male flower; B, cone; C, seed; D, cone scales. Cone about $\frac{1}{5}$ natural size; remainder to scale.

(Photos.: Dept. Agric. and Stock, Brisbane, except B, which is by F. Weatherhead.)

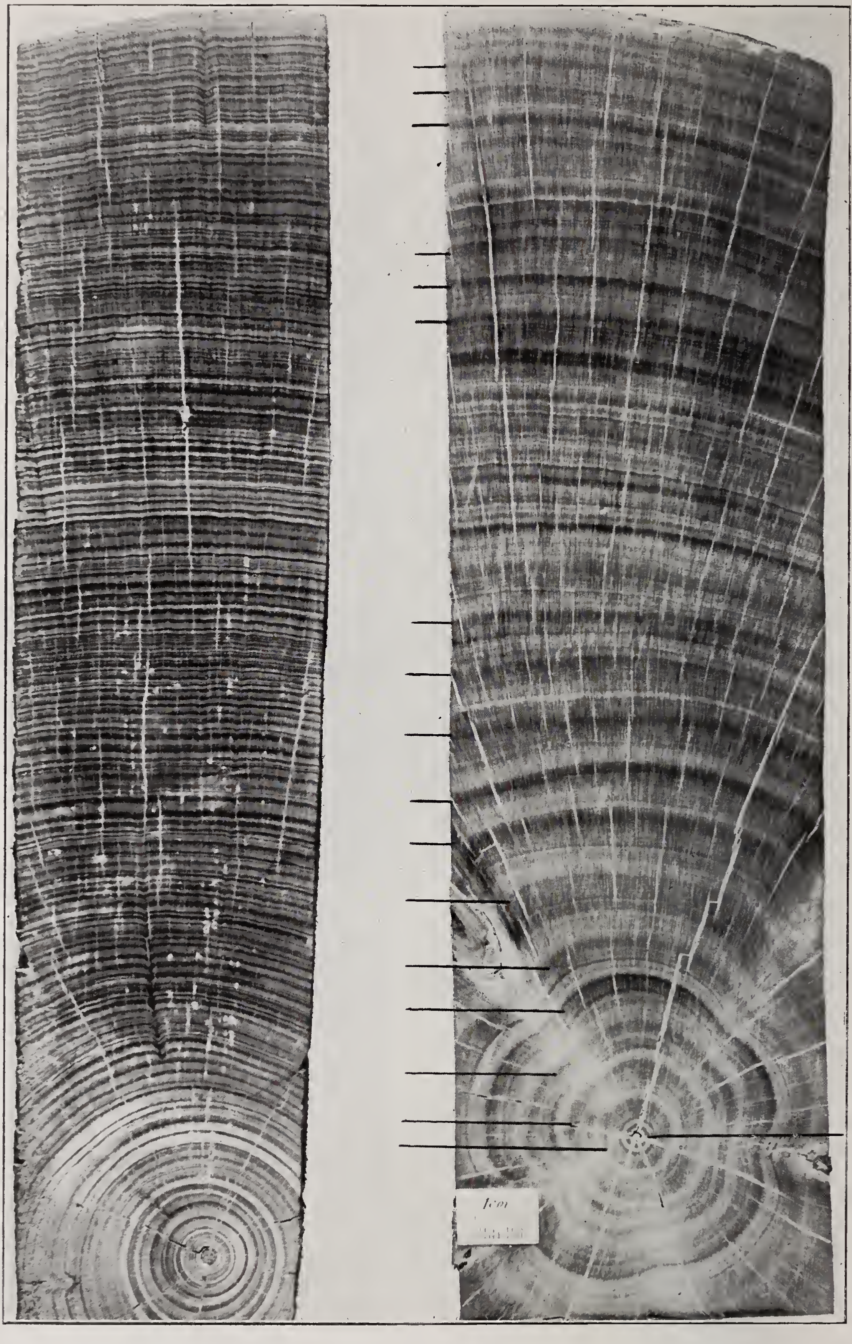

Fig. 20.—Araucaria Cunninghamii.—Smoothed surface of sections of stems, showing growth rings. The centimeter scale indicates the degree of reduction in both specimens. The section on right is from a tree of known age. The lines indicate the boundaries of evident annual rings.

(Reprinted, by permission, from the writer's paper in Proc. Linn. Soc. N.S.W., 53, 1928.)

(Photos.: Dept. Agric. and Stock, Brisbane.)

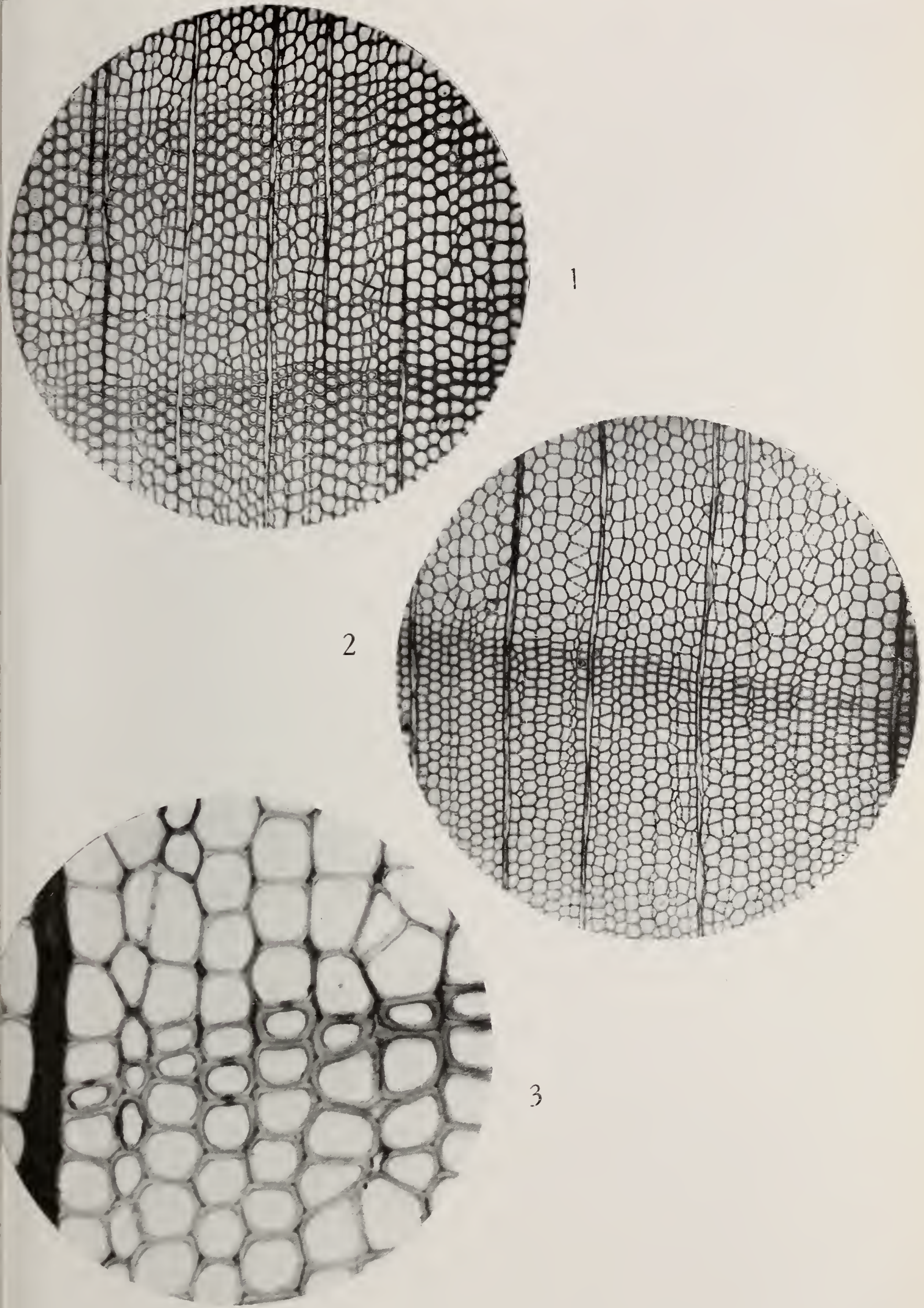

Fig. 21.—Transverse sections of wood of (1) *Araucaria Cunninghamii* (× 40), (2) *A. Bidwilli* (× 40), and (3) *Agathis robusta* (× 170), showing growth rings.
(Reprinted, by permission, from the writer's paper in Proc. Linn. Soc. N.S.W., 53, 1928.)
(Photomicrographs: W. D. F.)

almost cylindrical, not flanged. The bark is dark brown or nearly black in colour and is very rough. When the bark is cut through it is seen to be reddish brown in colour; it is exceptionally thick as the following measurements show:—2 in. on one tree with 3 ft. stem diameter, 3 in. on another tree with stem diameter of 2 ft., and 6 in. on another with a stem diameter of 2 ft. 6 in. Wood almost white. Leaves alternate, without very distinct stalks, crowded on the branchlets, lance-shaped or very narrow in outline, narrowed into a pungent point at the apex, without prominent veins, upper surface glossy; measurement of leaf, $\frac{3}{4}$–2 in. long, 4–6 times as long as broad. Both male and female flowers sometimes found on the same tree. Male flowers at the ends of very short branchlets arising from among the leaves of the larger branchlets, the flowers spike-like and each flower sometimes attaining 8 in. in length and $\frac{1}{2}$ in. in diameter. Each flower bears crowded scales or anthers about $\frac{1}{5}$ in. long; under the expanded summit of each scale or anther are about 12 narrow cells containing pollen. The female flowers arise laterally from the leaf-bearing branchlets and are composed of crowded carpels. The female flowers develop into the fruiting cones, which are ovoid in shape and attain 12 in. in length and 8 in. in breadth. The cones are composed of numerous overlapping and flattened scales about as long as broad and attaining 3 in. in breadth. Each cone-scale consists of the carpel (the broader, lower part) and the ligular scale combined. The seeds when they are developed are combined with the ligular scales on the upper side of the cone-scales. The seeds are egg-shaped and attain 2 in. in length and 1 in. in breadth. Flowering period: September and October.

Distribution.—Limited to South-eastern Queensland between the Bunya Mountains on the south and Gympie on the north.

Uses.—The timber is used for the same purposes as Hoop Pine is. In the early days of white settlement the seeds were an important article of food of the aborigines, who roasted them. When the trees were in fruit many tribes of blacks on the coast journeyed as far as 100 miles to the areas where the trees were growing. They feasted on the seeds and indulged in their festivities. The trees are often planted for ornamental purposes. The crowns of the trees are generally evenly dome-shaped.

Reference.—Araucaria Bidwilli W. J. Hooker in London Journal of Botany, vol. 2, p. 503, tablet 18, 1843.

The Growth Rings in the Wood of Australian Rain-forest Conifers.—The writer has examined sections of stems of the Hoop Pine (*Araucaria Cunninghamii*), Bunya Pine (*Araucaria Bidwilli*), and Queensland Kauri Pine (*Agathis robusta*). The growth rings in the wood of these rain-forest conifers are not characterised by the same degree of distinction and regularity as that of the rings in the wood of many European and North American trees. The trees from which the writer's material was obtained grew in Southern Queensland between 26° and 27° S. The climate where the trees grew is subtropical in character. Some of the rain-forest conifers, especially *Araucaria Cunninghamii* and *Araucaria Bidwilli*, often grow in forests of the drier type where the average annual rainfall may be less than 50 inches. Even in the Australian forests which have a high rainfall the precipitations are not so regular as those in Europe and North America. It is obvious also that the regular occurrence of low temperatures during considerable periods is not a feature of the climate of subtropical Australia. In view of these conditions it is not surprising that the rings of subtropical Australian conifers are so much less regular and distinct than those of many European and North American trees.

The growth rings of the Hoop Pine, Bunya Pine, and Queensland Kauri Pine consist of a light-coloured portion and a darker or brown-coloured portion. The lighter part evidently corresponds to the spring or early summer wood. The darker portion is formed presumably in the late summer or autumn. The writer found that the boundaries of the rings are more sharply defined in old, mature trees than in young, fast-growing ones. It is evident that two or perhaps even more rings are sometimes formed in one year in Australian conifers. On the other hand there are fairly definite indications that in the Hoop Pine there are varying numbers of rings each of which was produced in a single year. Rings of this kind are mostly characterised by their comparative uniformity. Examples of these annual rings are indicated by the lines drawn into the section shown in Fig. 20. The writer has suggested that rings of this kind, which are fairly uniform and are arranged in series, can be assumed to be annual and used as a basis for estimating the age of the trees in which they occur. The rings which conform to the criteria outlined are measured and their average or mean width calculated. The radius of the stem when divided by the mean width of the assumed annual rings gives the estimated age of the tree. This method if applied by an anatomist experienced in dealing with sections of subtropical Australian trees should be of considerable value in arriving at estimates of the ages of the trees. By this method the writer estimated the age of a Hoop Pine tree in the neighbourhood of Gympie (26° S.) as 135 years. The tree measured 21 in. (53 cm.) in stem diameter and 117 ft.

(35 m.) in total height. A part of the section from this tree is shown on the left in Fig. 20. Using part of a section of Queensland Kauri Pine from Kin Kin (26·2° S.) as a basis for calculation, an estimated total age of 228 years was arrived at. This tree measured 54 in. (135 cm.) in stem diameter and about 120 ft. (36 cm.) in total height. As the section represented only 11 in. (27·5 cm.) of the outer part of the radius of the stem, the data for estimation must be regarded as very meagre. Some of the large Queensland Kauri Pines which grew in the same district attained a stem diameter of 8 ft. (240 cm.) and a total height of 160 ft. (48 m.). If these trees grew at the same rate as the one from which the partial section was taken their age could be estimated at about 400 years.

The microscopic structure of the growth rings in the Hoop Pine, Bunya Pine, and Queensland Kauri Pine are shown in Fig. 21. The principal feature of the minute structure is the reduction in the transverse measurement of the tracheids of the outer or brown portion of the rings corresponding to the autumn or late-summer wood. These tracheids are also characterised by their thicker walls. Bordered pits in the tangential walls of the tracheids are restricted to the outer or brown portion of the rings. It was noticed that the bordered pits in the tangential walls are much more frequent in the Queensland Kauri Pine than in the Hoop Pine and the Bunya Pine.

A detailed discussion of the subject and a review of some pertinent American investigations will be found in the writer's paper entitled "The Growth Rings in the Wood of Australian Araucarian Conifers," Proc. Linn. Soc. N. S. Wales, 53, 71–79, 1928.

Family PALMAE (Palms).

The most frequent palms in the subtropical and temperate scrubs are the Bangalow or Piccabeen Palm (*Archontophoenix Cunninghamii*) and the Cabbage-tree Palm (*Livistona australis*). The Bangalow Palm is readily distinguished from the Cabbage-tree Palm by its leaves. The segments of the leaves of the Bangalow Palm are pinnately arranged, that is, they are attached to a long central axis. On the other hand the leaves of the Cabbage-tree Palm are fan-shaped and the leaf incisions are directed in a radial manner towards the apex of the leaf-stalk. The leaves of the Cabbage-tree Palm are shown on the left of the field picture of the Sour Cherry. A small Bangalow Palm is shown on the left of the field picture of the Mango Bark. *Archontophoenix Alexandrae* is a tropical Queensland species very similar in appearance to the Bangalow Palm, but is readily distinguished by the whitish or grey underside of the leaves. The Walking-stick Palm (*Bacularia monostachya*) is common in subtropical scrubs. It is a shrub with a woody stem marked by prominent transverse rings and bears a crown of leaves. A specimen of this palm is shown on the right side of the field picture of the Bolly Gum. The Lawyer Cane belongs to the Palm family and is a prickly climber. The common species of Lawyer Cane in subtropical scrubs is *Calamus Muelleri*. It is shown on the upper left side of the field picture of *Cryptocarya patentinervis*. Some of its leaves are also shown on the right of the same picture. *Flagellaria indica* is a vine with a cane-like stem which is frequent in subtropical and temperate scrubs. It is not a palm, and is readily distinguished from the Lawyer Palms by its lack of prickles and by its possession of long spirally twisted leaf-points.

Family FAGACEAE.

Fagus Moorei F.v.M. Antarctic Beech, on account of its close botanical relationship to the English Beech (*Fagus sylvatica*). Figs. 22 and 23.

Derivation.—Fagus from Latin *fagus*, a beech tree; Moorei after Chas. Moore.

Description.—A large tree attaining 100 ft. in height and a stem diameter of 3 ft. 6 in. In the great majority of the trees in the southern ranges of Queensland they are much less than 100 ft. in height; the trees are generally irregular, rarely perpendicular, and the stems are very frequently joined at the base as if the younger trunks had grown out from coppice shoots at or near the base of the older ones. Bark brown, often scaly and shed in oblong flakes; when cut outer layer red, inner layer nearly white, the entire bark measuring $\frac{1}{3}$–$\frac{3}{4}$ in. thick on a tree with a stem diameter of 3 ft. 6 in. Young shoots often covered with a brown-coloured down. Leaf-stalks $\frac{1}{8}$–$\frac{1}{4}$ in. long, with 2 narrow stipules about $\frac{1}{4}$ in. long on each side at the base. These stipules are not always present as they soon fall off. Leaves alternate, egg-shaped in outline, almost always unequal-sided at the base, margins prominently toothed, apex rounded or pointed; the midrib, lateral nerves, and net-veins visible on both surfaces; measurement of leaf-blade 1–2$\frac{1}{2}$ in. long, as long as to twice as long as broad. Male and female organs in separate flowers (flowers unisexual). Male flowers in catkins. Catkins round

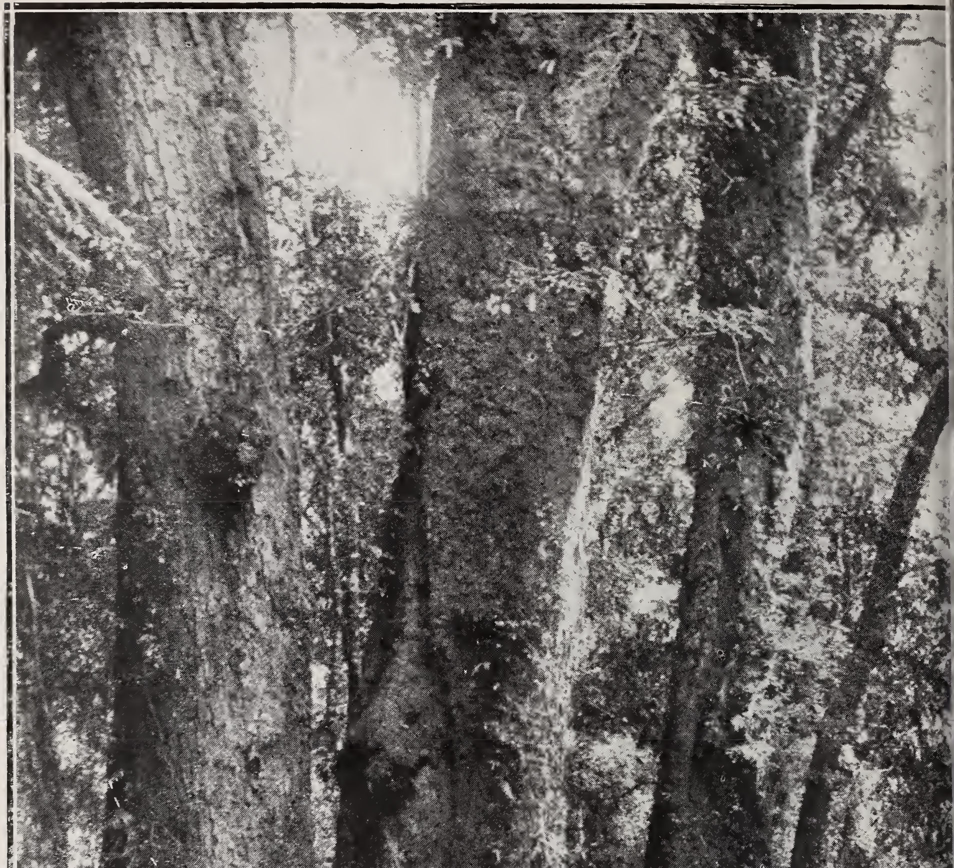

Fig. 22.—Antarctic Beech (*Fagus Moorei*). Roberts Plateau, Macpherson Range, about 28.3° S. The basal junctions of the stems are shown in the picture.

(*Photo.: W. D. F.*)

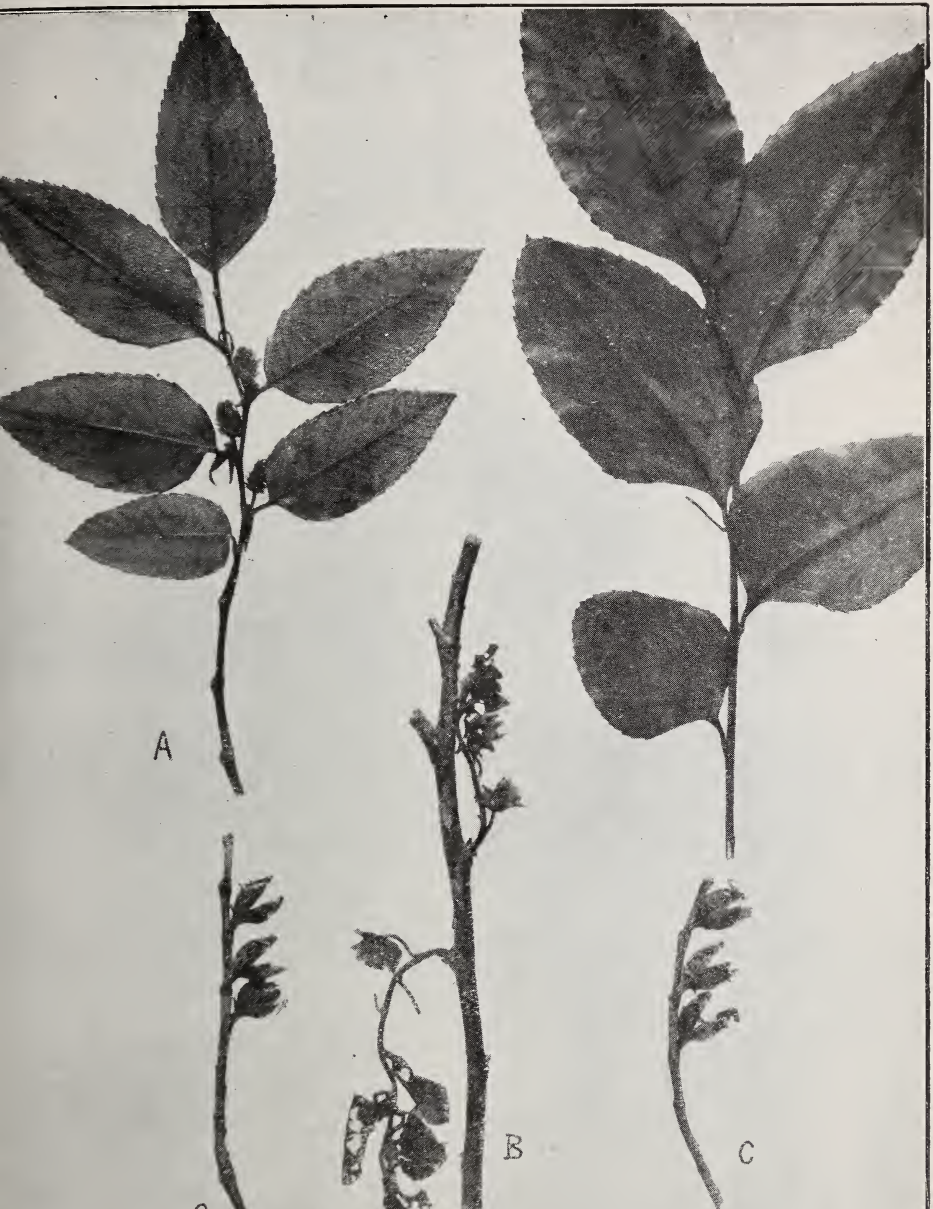

Fig. 23.—Antarctic Beech (*Fagus Moorei*). A, branchlet, showing female inflorescences; branchlet showing male inflorescences; C, branchlets with empty fruiting involucres. All dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

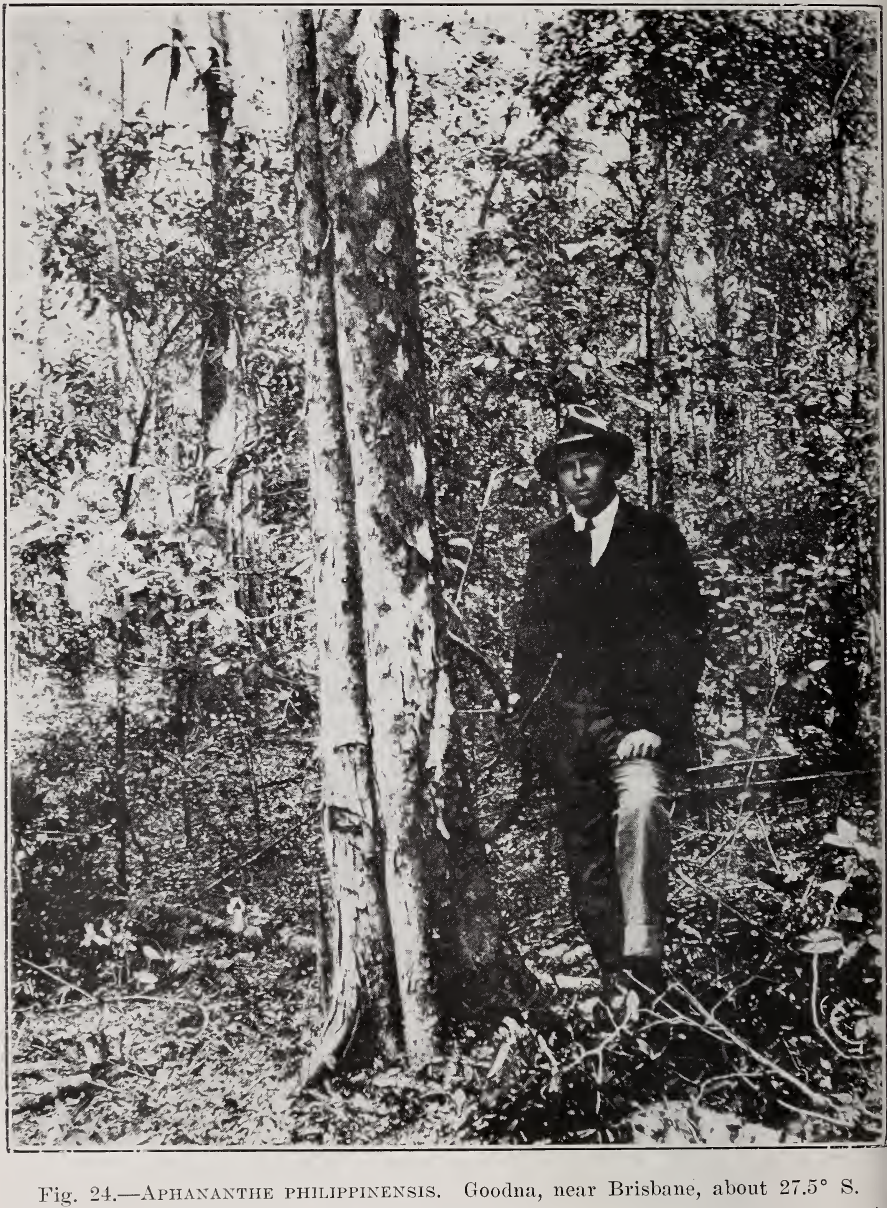

Fig. 24.—Aphananthe philippinensis. Goodna, near Brisbane, about 27.5° S.
(*Photo.: W. D. F.*)

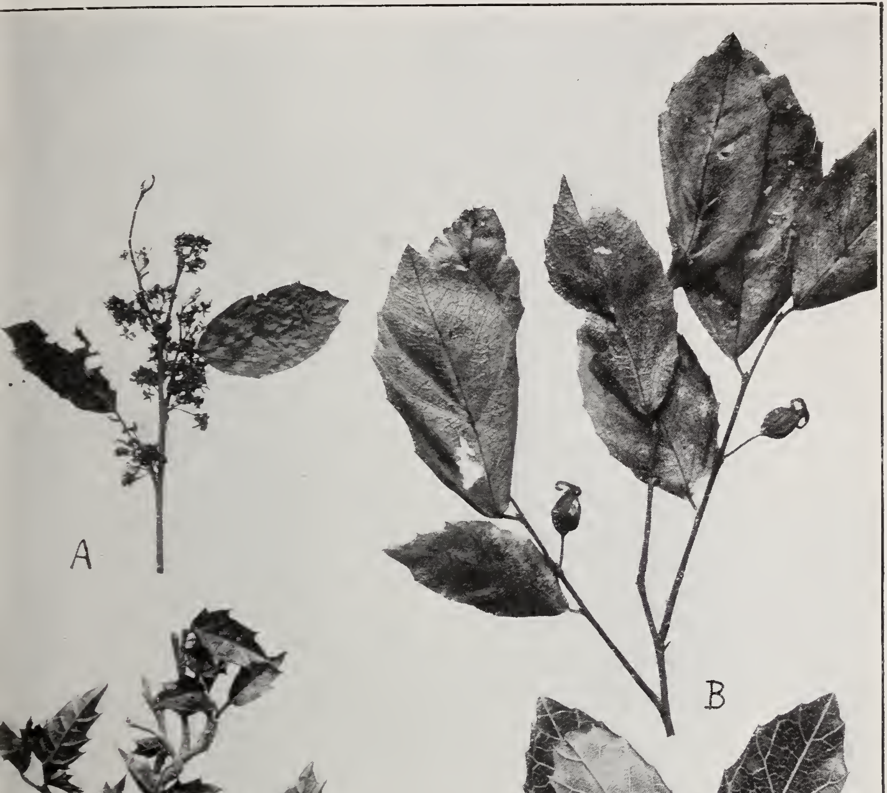

Fig. 25.—APHANANTHE PHILIPPINENSIS. A, twig bearing inflorescences; B, fruit-bearing twigs; C, coppice shoot. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

or flattened, about $\frac{3}{8}$ in. diameter, inserted in the forks of the leaves on stalks $\frac{1}{8}$–$\frac{1}{4}$ in. long. The lower part of the catkins consists of a cup-shaped involucre, 8–12-lobed at the rim, enclosing numerous (over 15) stamens. Stamens consisting of narrowly elliptical anthers, $\frac{1}{12}$–$\frac{1}{8}$ in. long, borne on stalklets (filaments) sometimes attaining $\frac{1}{16}$ in. in length. Female inflorescence (female catkin) in the forks of the leaves, borne on stalks about $\frac{1}{10}$ in. long. Each catkin consists of numerous small bracts united to form an egg-shaped body about $\frac{1}{5}$ in. long, containing 3 female flowers. The fruit or mature female catkins attain $\frac{3}{10}$ in. in length and open in 4 valves exposing the 3 enclosed angular nuts.

Distribution.—Higher parts of the Macpherson Range, such as Roberts Plateau, Lamington Plateau, Mt. Merino, Mt. Widgee, &c. As far south as Upper Gloucester River in N. S. Wales (J. H. Maiden).

References.—*Fagus Moorei* F.v.M., Fragmenta Phytographiae Australiae, vol. 5, p. 109, 1865–1866 ; *Nothofagus Moorei* J. H. Maiden, Forest Flora of N. S. Wales, vol. 7, p. 365, 1922 ; *Fagus Carronii* C. Moore, quoted as a synonym in C. Moore's Handbook of Flora of N. S. Wales, p. 85, 1893.

Fagus Cunninghamii Hook. Myrtle tree of Tasmania. Described by Rodway (Tasmanian Flora, p. 182) as tree often exceeding 100 ft. Leaves and fruit similar to those of *Fagus Moorei* (see Fig. 23) but leaves smaller ($\frac{3}{10}$–1 in. long) and fruits shorter (about $\frac{1}{4}$ in. long).—Tasmania and Victoria.

Family ULMACEAE.

Leaf margins mostly entire ; leaf surfaces smooth .. .. .. 1. *Celtis.*
Leaf margins prominently toothed ; leaf surfaces harsh or rough .. 2. *Aphananthe.*

1. CELTIS.

Celtis paniculata Planch. Leaves alternate, stalks $\frac{1}{4}$–$\frac{3}{8}$ in., blades $2\frac{1}{4}$–$3\frac{3}{4}$ in. long, 2–3 times as long as broad, with two fairly prominent nerves in addition to midrib at base, unequal-sided at base. Leaf-stalk flattened towards leaf-blade. Fruit egg-shaped, black, about $\frac{3}{8}$ in. long, borne singly on stalk arising from the forks (axils) of the leaves. Each fruit contains a single seed.—Kiama (Benth.) to Endeavour River ; Norfolk Id.

2. APHANANTHE.

Aphananthe philippinensis Planch. Native Elm, Axe-handle Wood, Grey Handlewood. Figs. 24 and 25.

Derivation.—Aphananthe from Greek *aphanes* invisible, *anthos* a blossom (alluding to the small flowers) ; philippinensis indicates that the species was first found in the Philippine Islands ; *ensis* from Latin *enensis* signifying of or belonging to.

Description.—A tree attaining a height of about 80 ft. and a stem diameter of about 2 ft., but often much smaller. Stem not deeply buttressed at the base. Bark brownish grey, scaly ; inner bark dark brown, fibrous. Thickness of bark $\frac{1}{6}$ in. on a tree with a stem diameter of 15 in. Sapwood white. Leaf-stalks about $\frac{1}{8}$ in. long. Leaves alternate, egg-shaped in outline, with sharply toothed margins, and rough surfaces which are like sandpaper to the touch, under surface with prominent raised nerves ; midrib, lateral nerves, and net-veins visible on both sides ; measurement of leaf-blade 1–2 in. long. Coppice ("sucker") leaves often like Holly leaves and much smaller and with larger and sharper teeth than the adult leaves. Male and female flowers separate. Male flowers in small inflorescences (cymes) much shorter than the leaves, in the forks of the leaves or springing from the scars of fallen leaves. Individual male flowers are about $\frac{1}{5}$ in. in diameter and consist of 4 or 5 narrow perianth segments on the inner side of which are 4 or 5 stamens, each stamen about as long as and opposite to each perianth segment. Female flowers are single or rarely 2 together ; they are situated on a stalk about $\frac{1}{5}$ in. long which springs from the forks of the leaves ; they have the 4 or 5 narrow perianth segments as in the males, but in place of stamens have in the centre a single ovary which develops into an egg-shaped fruit over $\frac{1}{4}$ in. long surmounted by a hairy forked style and containing 1 cell with a single seed.

Distribution.—Australia and Philippine Islands. Northern Rivers of N. S. Wales as far south as the Manning River (J. H. Maiden). Scrubs of coastal Eastern Queensland both north and south. Evelyn near Herberton is the northernmost locality represented in the Queensland Herbarium. It extends as far inland as Toowoomba.

Uses.—The wood has been used for axe-handles.

Reference.—*Aphananthe philippinensis* Planchon in Annales des Sciences Naturelles, ser. iii., x., 337.

Family MORACEAE.

Fruit consisting of a 1-seeded berry. Male flowers in slender spikes 1. *Pseudomorus.*
Fruit consisting of a fleshy receptacle (fig) on the inner surface of which the minute flowers are arranged .. .. .. 2. *Ficus.*

1. PSEUDOMORUS.

Pseudomorus Brunoniana Bur. Whalebone tree, Axe-handle Wood, Waddywood, Ragwood, Grey Handlewood. Fig. 26.

Derivation.—Pseudomorus from Greek *pseudes*, false ; *moron*, a mulberry (refers to the resemblance of some part of the tree to the mulberry) ; Brunoniana, after Robert Brown.

Description.—A small tree attaining a height of about 40 ft. and a stem diameter of 9 in. Bark grey or greyish brown ; inner bark white ; measurement of bark $\frac{1}{6}$ in. thick on a tree with a stem diameter of 9 in. Green parts and bark exude a milky sap when broken. Leaf-stalks $\frac{1}{12}$–$\frac{1}{4}$ in. long. Leaves alternate, elliptical or egg-shaped in outline, drawn out into a long point at apex, margins toothed, leaf surfaces rough to the touch ; midrib, lateral nerves, and net-veins visible on both surfaces but raised and more prominent on underside ; measurement of leaf-blade 1–3 in. long, 2–4 times as long as broad. Coppice (" sucker") leaves often much smaller or in other cases much longer than the ordinary leaves. Male flowers in dense spikes $\frac{1}{2}$–2 in. long, in the forks (axils) of the leaves ; each flower stalkless and about $\frac{1}{12}$ in. diameter and consisting of an envelope (perianth) of 4 concave, boat-shaped segments about $\frac{1}{24}$ in. long ; the perianth enclosing 4 stamens, each stamen almost $\frac{1}{12}$ in. long and opposite to each perianth segment. Female flowers in small clusters or short spikes of 2–4 flowers in the forks (axils) of the leaves or at the scars of fallen leaves ; each flower stalkless and consisting of an envelope (perianth) of 4 broad segments about $\frac{1}{24}$ in. diameter surrounding a central, hairless, egg-shaped ovary surmounted by a style divided to the base into 2 curved lobes. The ovary develops into the small, egg-shaped, 1-seeded fruit measuring about $\frac{1}{5}$ in. long and surmounted by the minute forked style. Flowering period : March and April.

Distribution.—Eastern Australia, New Caledonia, Norfolk Id., Polynesia, and New Guinea. It extends in coastal Eastern Australia from Illawarra, N.S.W. (J. H. Maiden), to North Queensland and as far inland as the Bunya Mountains (about 100 miles from the coast).

Uses.—The wood has been used for axe-handles and for the handles of other tools. When grown in the open the trees form a very dense round head of foliage.

Remarks.—Some specimens of *Aphananthe philippinensis* very closely resemble specimens of this species. The milky sap and less rough leaves with finer marginal teeth are the best means of distinguishing this species from *Aphananthe.*

Reference.—*Pseudomorus Brunoniana* Bureau in Annales des Sciences Naturelles, ser. v., xi., 372.

2. FICUS.

Ficus infectoria Roxb. White Fig. Fig. 27.

Derivation.—Latin *ficus*, a fig tree ; infectoria from Latin *infector* a dyer, from *inficio*, I dye or stain (exact application obscure).

Description.—A very large, partly deciduous tree attaining a height of over 100 ft. and a column diameter of over 6 ft. The trees grow directly from the ground but more frequently enmesh other trees. Column with buttresses, but the flattening of the aerial roots is not so conspicuous as in the Moreton Bay and Small-leaved Figs. Bark grey or dark grey ; when cut light reddish brown, exuding a milky juice, measuring $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. Young green branchlets marked by the ring-like scars of the fallen stipules. Enclosing the young buds are leaf-scales which are membranous and vary in length from $1\frac{1}{2}$ to 2 in. and soon fall away. Stipules, one of which encloses each leaf in bud, about $\frac{1}{2}$ in. or less in length, broad at base, tapering at apex, deciduous. Leaf-stalks 1–2 in. long. Leaves alternate. Leaf-blades egg-shaped in outline, broad at the base, abruptly tapering into a distinct point at the apex, much thinner in texture than the leaf of the Moreton Bay Fig ; midrib, lateral nerves, and net-veins visible on both sides, the basal pair of lateral nerves more oblique than the others ; measurement of leaf-blade, $2\frac{1}{2}$–$5\frac{1}{2}$ in. long, 2–3 times as long as broad. Fruit (receptacles) globular, in pairs in the forks (axils) of the leaves, stalkless or nearly so, with 3 round flat bracts about $\frac{1}{8}$ in. diameter at base of each fruit. The fruit are white dotted with red and measure about $\frac{1}{2}$ in. diameter.

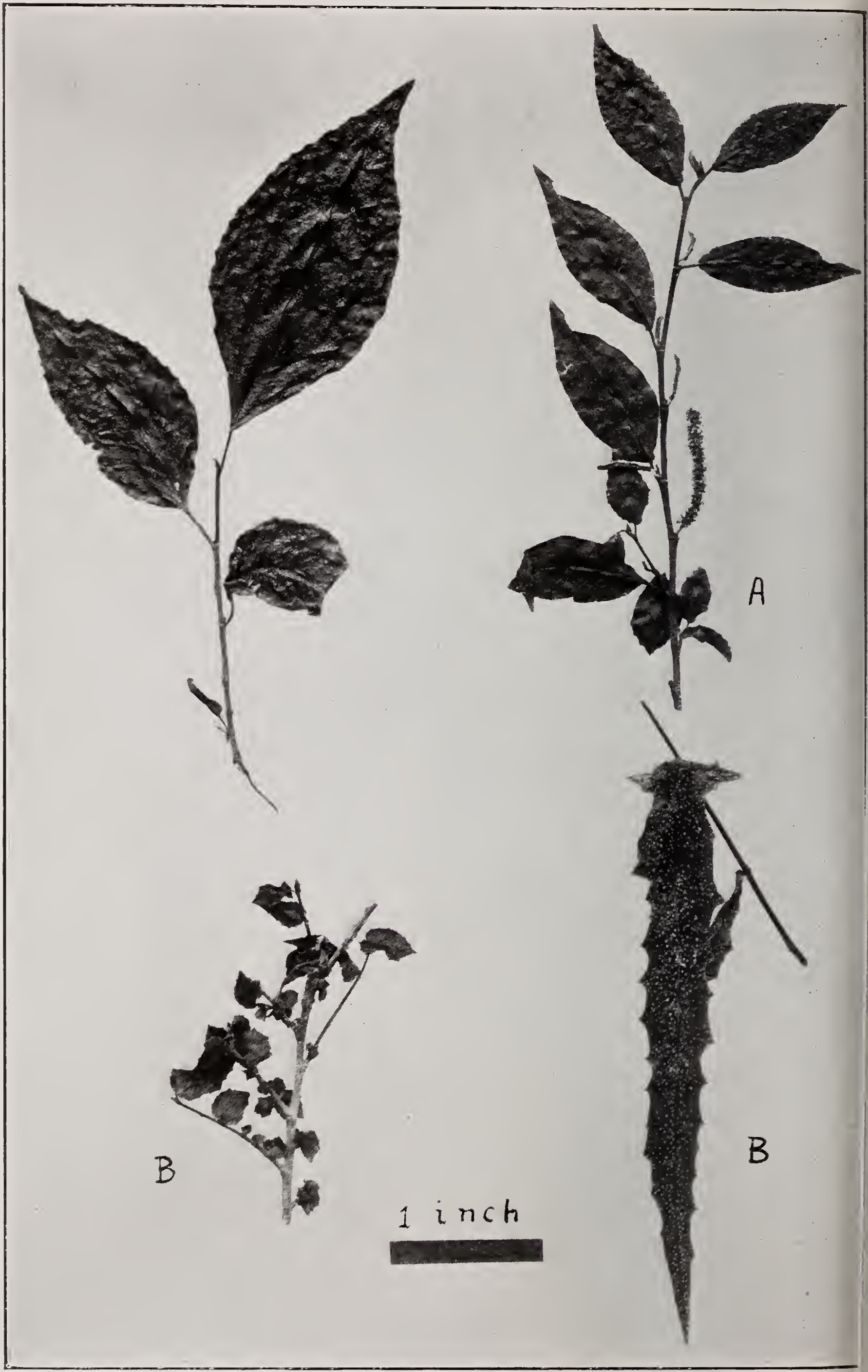

Fig. 26.—Whalebone Tree (*Pseudomorus Brunoniana*). A, branchlet with male inflorescences; B, coppice (sucker) shoots. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

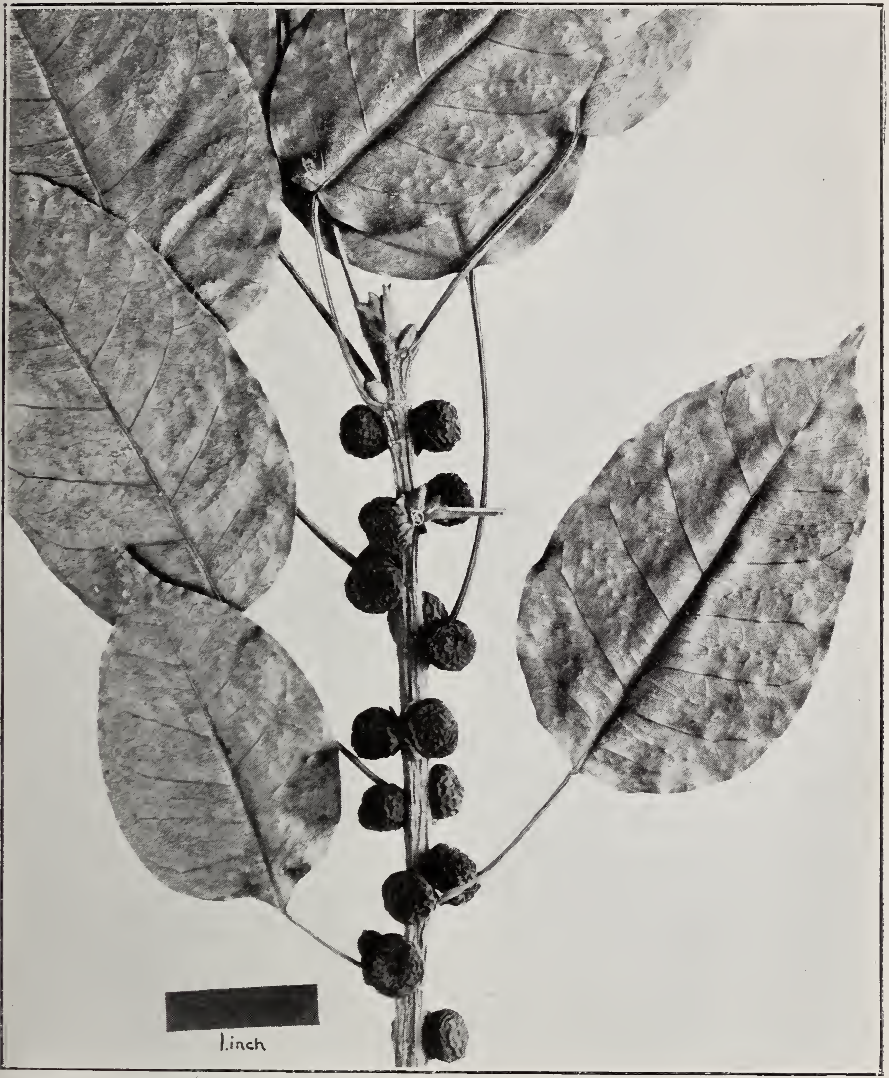

Fig. 27.—Ficus infectoria. Branchlet with dry fruits. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

Distribution.—India, Malay Peninsula, and Australia. Common in the coastal scrubs of Eastern Australia from as far south as the Macleay River, N.S.W. (C. Moore), to North Queensland. It is the commonest fig tree in the scrubs of the Sarina district, south of Mackay, Queensland.

Botanical Note.—Sir George King in his work " The Species of Ficus of the Indo-Malayan and Chinese Countries" (Annals of Royal Botanic Gardens, Calcutta, vol. 1, p. 50, 1887) states : " Mr. Bentham (Flora Australiensis, vol. 6, p. 164) suggests that both *Ficus nesophila* and *Ficus Cunninghamii* may prove to be forms of *Ficus infectoria* Roxb. As far as the material at Kew goes, I should refer the whole of the sheets named *F. Cunninghamii* to *infectoria* and most of them to its variety *Lambertiana.*" King gives a very full description and account of *F. infectoria* on pp. 60–64, plates 75–79, in his work quoted above. Fresh specimens of *F. Cunninghamii* from Southern Queensland seem to differ from King's description and figures of *F. infectoria* in the size of the receptacles only (measuring about $\frac{1}{2}$ in. diameter in the fresh specimens, whereas King gives the measurement as $\frac{1}{4}$ in.). His measurement may apply to dried specimens. The Queensland specimens in the Queensland Herbarium seem to agree with the typical form of *F. infectoria. Ficus infectoria* is therefore adopted as the name of the Australian species previously known as *Ficus Cunninghamii.*

References.—*Ficus infectoria* Roxburgh in Flora Indica, vol. 3, p. 551 ; *Ficus Cunninghamii* Miquel in Ann. Mus. Lugd. Bat., 3, 286.

Ficus eugenioides F.v.M. Small-leaved Fig. Figs. 28, 29, 30.

Derivation.—Latin *ficus,* a fig tree ; eugenioides from *Eugenia,* the name of a genus of Myrtaceous trees, Greek *eidos,* resemblance (referring to the likeness of the species to a *Eugenia*).

Description.—A very large tree attaining 160 ft. in height and a column diameter of 10 ft. Column buttressed, often enclosing the remains of the tree upon which it grew. Bark grey or brownish, almost smooth ; when cut reddish brown, flesh-coloured near sapwood, exuding a viscous, milky juice, measuring $\frac{5}{16}$ in. thick on a tree with a column diameter of 10 ft. Sapwood pale yellow. Young leaves protected by enfolding narrow, pointed stipules $\frac{1}{8}$–$\frac{1}{2}$ in. long. Leaf-stalks slightly flattened, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Leaves alternate, elliptical in outline, narrowed at the apex into a short blunt point ; midrib, lateral nerves, and net-veins visible on both sides ; measurement of leaf-blade, $1\frac{3}{4}$–3 in. long and about twice as long as broad. Fruit (receptacles) globular, yellow with a few dark spots, in pairs in the forks (axils) of the leaves, each receptacle inserted on a very short thick stalk $\frac{1}{24}$–$\frac{1}{12}$ in. long. Measurement of fruit $\frac{1}{4}$–$\frac{1}{3}$ in. diameter.

Distribution.—The species as described above is common in the scrubs of Kin Kin and Bunya Mountains and has been found as far north as Mt. Perry to the west of Bundaberg. All of these are Queensland localities. There is a possibility that the species may not be identical with *Ficus eugenioides,* which is described in the Flora Australiensis as a small tree with sessile receptacles and recorded from Northumberland Ids., Albany Id., Rockhampton, and the Tweed River (N.S.W.)

Reference.—*Ficus eugenioides* F. v. Mueller in Docum. Interc. Exhib., 26, 1866.

Ficus platypoda A. Cunn. Small-leaved Moreton Bay Fig. Leaves alternate. Leaf-stalks $\frac{3}{4}$–2 in. long ; blades egg-shaped or elliptical in outline, mostly green on both sides, $3\frac{1}{2}$–$5\frac{1}{2}$ in. long., 2–3 times as long as broad ; fruit (receptacles) globose, $\frac{1}{3}$–$\frac{5}{8}$ in. diameter., mostly borne on stalklets exceedingly short or up to $\frac{3}{8}$ in. long.—N. S. Wales (Maid. and Betche). Brisbane River to Rockingham Bay (Benth.) ; inland to Inglewood near Goondiwindi.

Ficus macrophylla Desf. Moreton Bay Fig, Black Fig (on account of the dark bark of trees growing in dense scrubs), Figwood. Figs. 31 and 32.

Derivation.—Latin *ficus,* a fig tree ; macrophylla from Greek *macros,* long ; *phyllon,* a leaf (alluding to the large leaves).

Description.—A large tree attaining 160 ft. in height and a column diameter of over 6 ft. Column widely buttressed. The trees grow directly from the soil or enmesh other scrub trees. Most of the trees in luxuriant scrubs are or have been supported on other trees. Bark grey, dark grey or nearly black on the very large trees, rough with small pustules or somewhat scaly on large trees ; when cut it is seen to be pinkish white and exudes large quantities of a milky viscous juice ; it measures about $\frac{1}{2}$ in. thick on a tree with a column diameter of 4 ft. Branchlets thick, marked by the ring-like scars of the fallen stipules. The young buds are protected by stipules which are folded around them. The stipules are broad at the base, taper into a long point, are slightly downy on the outside, and measure about 4 in. in length. Leaf-stalks $1\frac{1}{2}$–$3\frac{1}{2}$ in. long and $\frac{1}{6}$–$\frac{1}{5}$ in. thick. Leaves alternate, leathery in texture, dark green and glossy

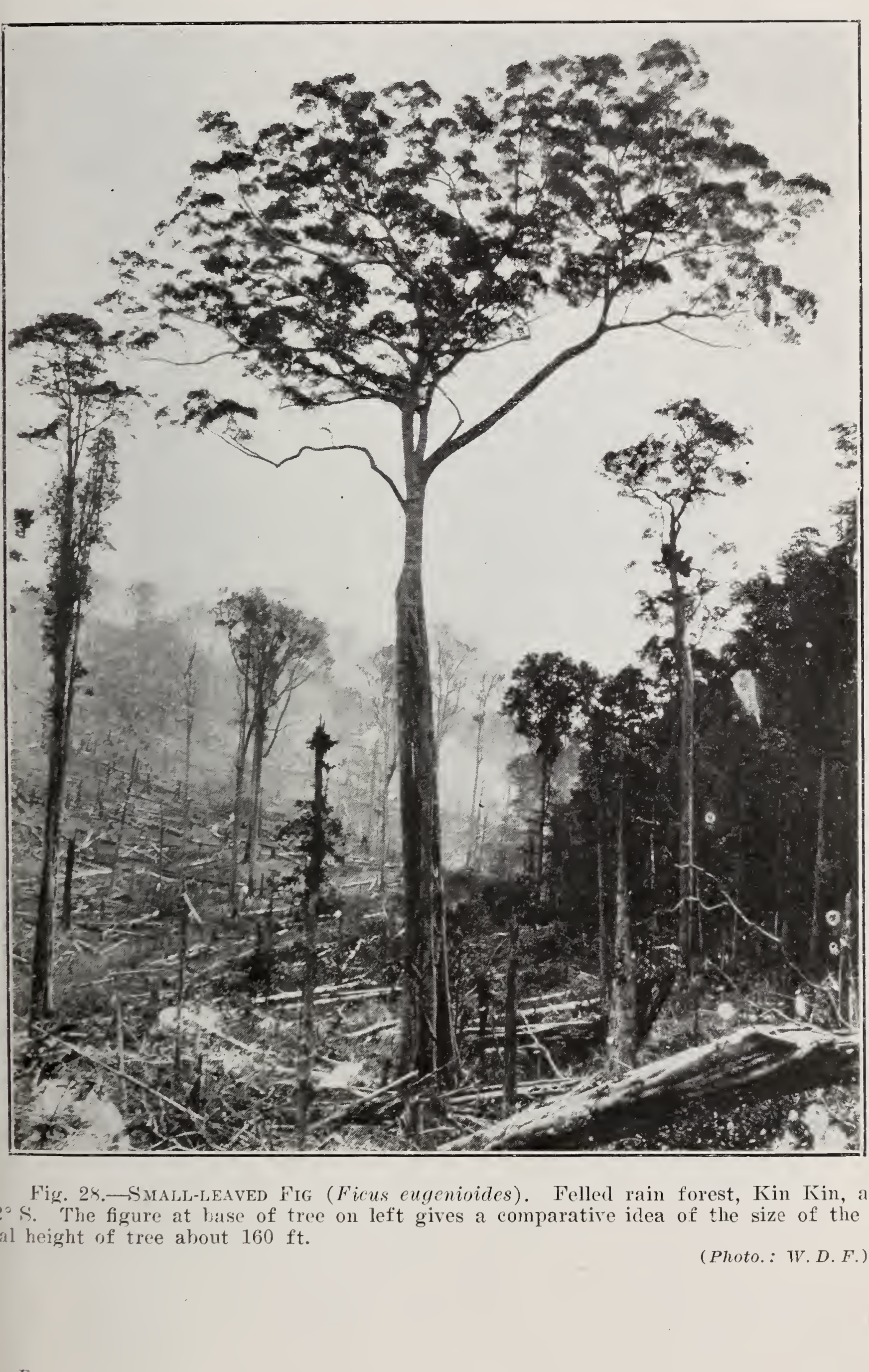

Fig. 28.—Small-leaved Fig (*Ficus eugenioides*). Felled rain forest, Kin Kin, about 6.2° S. The figure at base of tree on left gives a comparative idea of the size of the tree. otal height of tree about 160 ft.

(*Photo.: W. D. F.*)

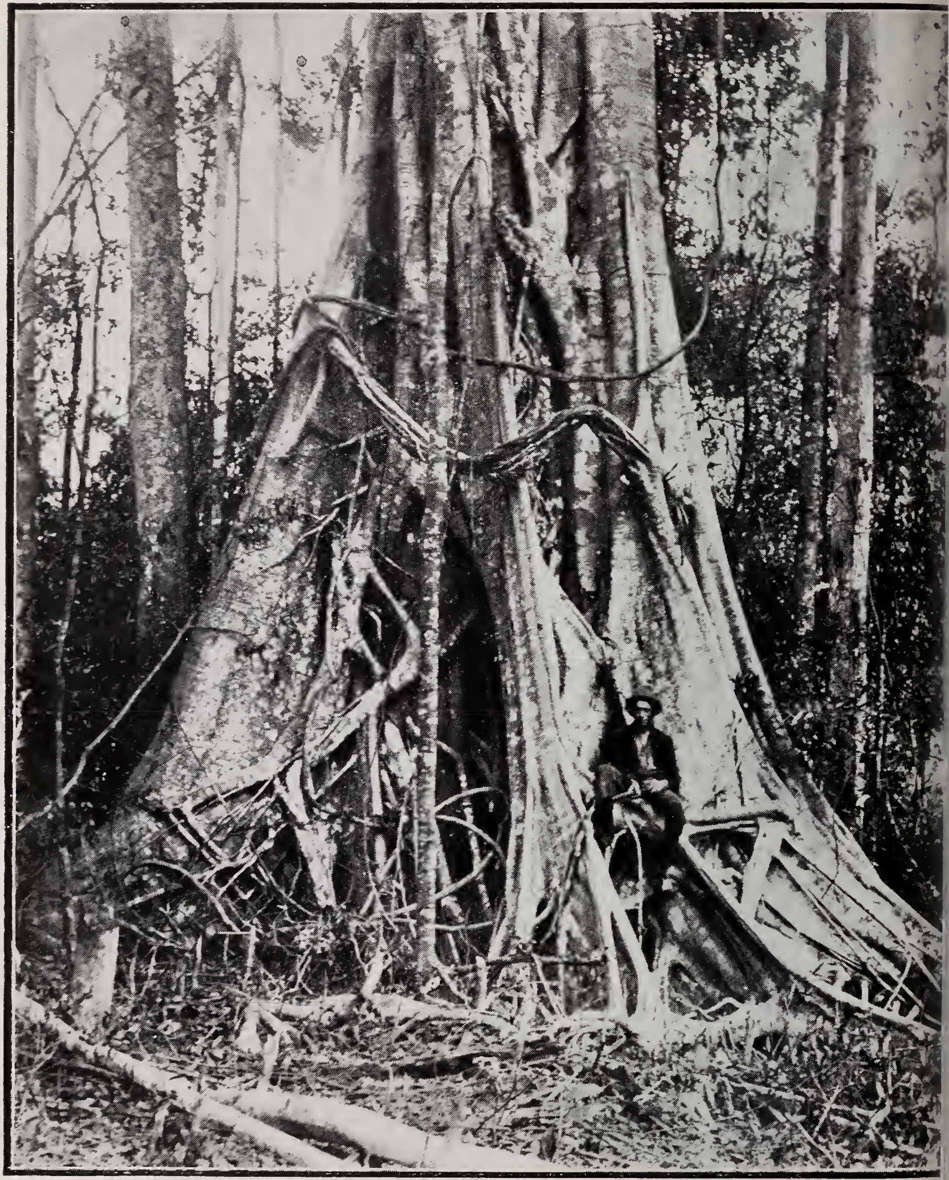

Fig. 29.—Small-leaved Fig (*Ficus eugenioides*). Kin Kin, about 26.2° S. The meshwork of aerial roots forming the column of the tree is evident in the picture.

(*Photo.: W. D. F.*)

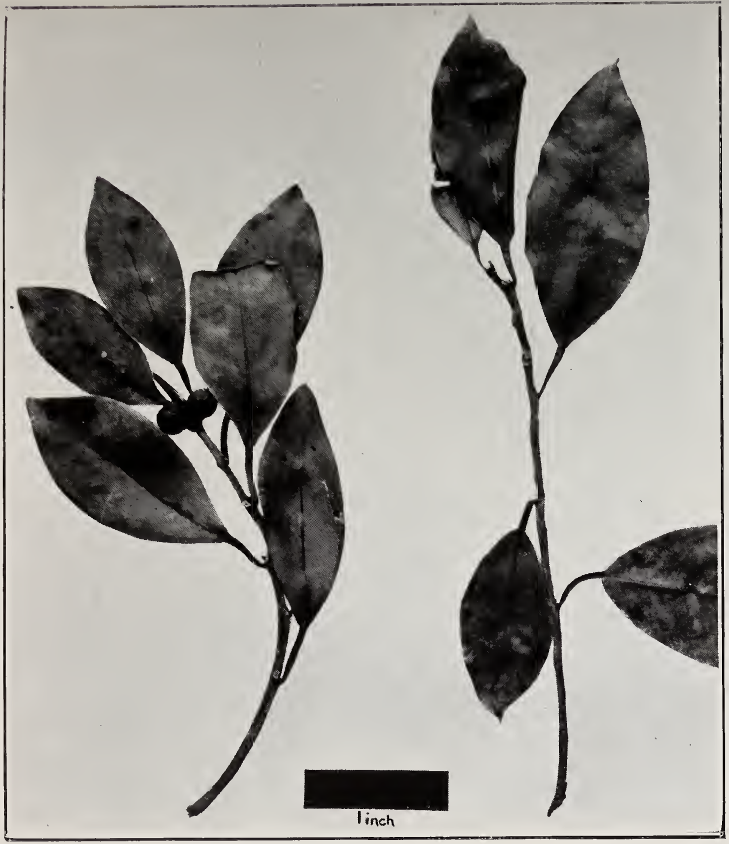

Fig 30—Small-leaved Fig (*Ficus eugenioides*). Fruit-bearing branchlet on left. All in dry state.

(*Photo: Dept. Agric. and Stock, Brisbane.*

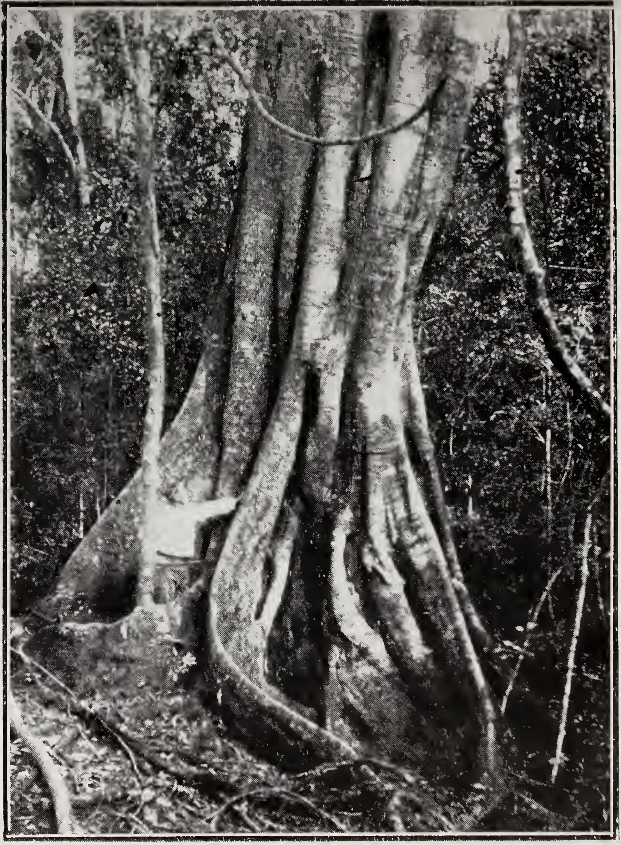

Fig. 31.—Moreton Bay Fig (*Ficus macrophylla*). Imbil, about 26.4° S.

(*Photo.: W. D. F.*)

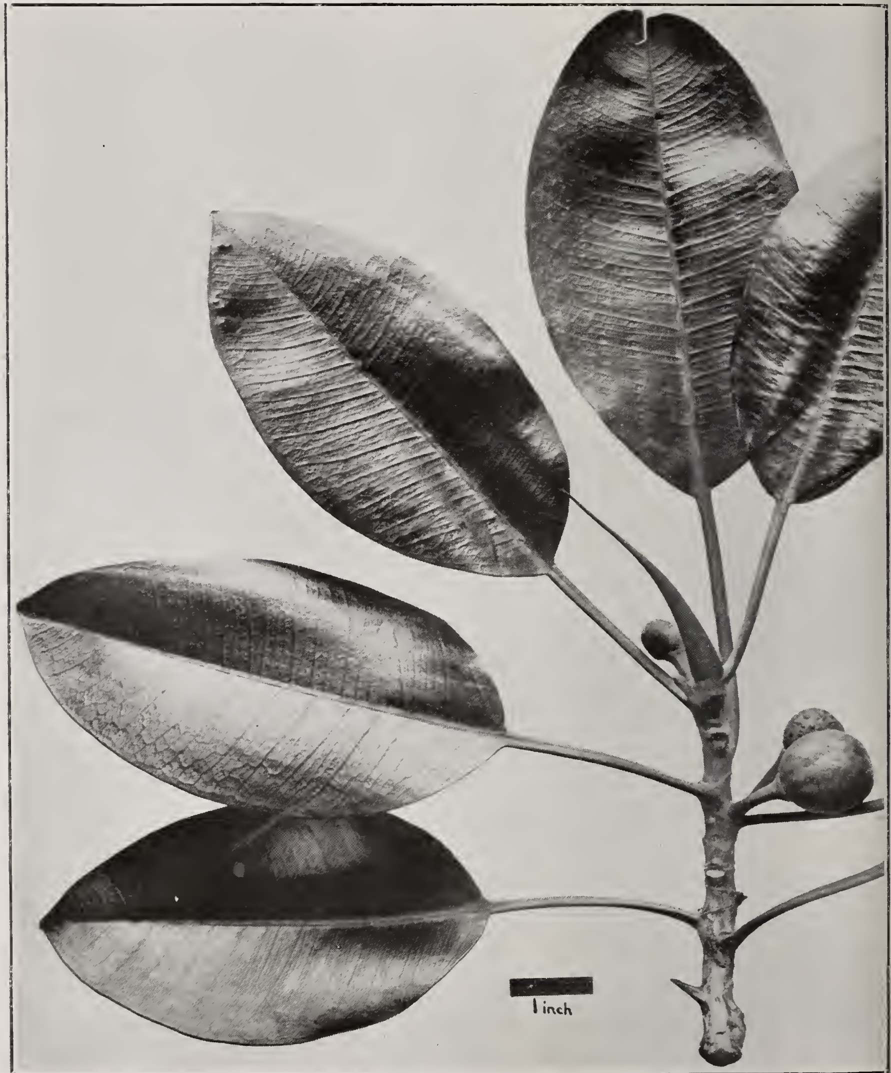

Fig. 32.—Moreton Bay Fig (*Ficus macrophylla*). Fruit-bearing branchlet.
(*Photo.: Dept. Agric. and Stock, Brisbane.*)

above, often brown on underside on mature trees, narrowly egg-shaped in outline, the apex narrowed to a very short blunt point, lateral nerves and net-veins more conspicuous on the underside, the lowermost pair of lateral nerves often more oblique than the others ; measurement of leaf-blade, 4–8 in. long and about twice as long as broad. The leaves of seedlings have a rounded projection or auricle at the base of the blade on each side of the stalk and the younger seedling leaves have toothed or lobed margins. Fruit (receptacles) borne on thick stalks $\frac{3}{4}$–1 in. long arising from the forks of the leaves. The receptacles are generally globular in shape, about 1 in. diameter, and are purple dotted with white when ripe. Fruiting period irregular ; young and mature fruits were found on the trees in October.

Distribution.—Coastal scrubs from Shoalhaven River, N.S.W. (C. Moore), to Rockingham Bay, North Queensland (F.v.M.), extending as far inland as Bunya Mountains (about 100 miles from coast).

Uses.—The species is extensively planted as a shade and ornamental tree. The leaves when they fall to the ground are readily eaten by stock.

Reference.—*Ficus macrophylla* Desfontaines Cat. Pl. Hort. Paris, 209, 1804.

Ficus Watkinsiana F.M.B. Green-leaved Moreton Bay Fig, Figwood. Fig. 33.

Derivation.—Latin *ficus*, a fig tree ; Watkinsiana, after George Watkins.

Description.—A large tree attaining 150 ft. in height and a column diameter of 6 ft. In a large number of instances the column surrounds the trunk or the remains of a tree on which the fig tree was sheltered. Column broadly buttressed. Bark grey, slightly rough with small scattered pustules. Branchlets thick, marked by the scars of the fallen leaves and the ring-like scars of the fallen stipules. Enclosing each young leaf in the bud is a stipule which is narrow, concave, tapers into a long point, and measures 2–3 in. long. Leaf-stalks 1$\frac{1}{2}$–2$\frac{3}{4}$ in. long. Leaves alternate, elliptical, drawn out into a short blunt point, green on both surfaces ; midrib, lateral nerves, and net-veins visible on both surfaces, the basal pair of lateral nerves often more oblique than the others ; measurement of leaf-blade, 4–7$\frac{1}{2}$ in. long, about 2$\frac{1}{2}$ times as long as broad. Fruit (receptacle) stalks attaining almost 1 in. in length, broad and expanded under the fruit. Fruit (receptacles) in pairs in the forks (axils) of the leaves, one of each pair often falling away before maturity. The receptacles are globose or slightly egg-shaped, with a point or nipple at the apex ; they are hard, often attaining 1$\frac{3}{4}$ in. in length and 1$\frac{1}{4}$ in. in breadth, deep purple when ripe. Fruiting period : ripe fruits were gathered in October and November.

Distribution.—Coastal scrubs from Bellinger River, N.S.W. (C. Moore), to Gympie, Queensland, extending as far inland as Bunya Mountains (about 100 miles from the coast).

References.—*Ficus Watkinsiana* F. M. Bailey, Botany Bulletin No. 2, p. 18, 1891 ; *Ficus Bellingeri* C. Moore, Handbook of Flora of N. S. Wales, p. 81, 1893.

Ficus rubiginosa Desf. Rusty Fig, Port Jackson Fig, Illawarra Fig. According to J. H. Maiden attains 100–150 ft. in height and column diameter of over 6 ft. Branchlets thick and often finely hairy. Leaves alternate. Stalks often finely hairy, $\frac{1}{2}$–1$\frac{3}{4}$ in. Blades egg-shaped or elliptical in outline, often drawn out into a very short blunt point at apex ; midrib and parallel lateral nerves (of which there are 10–15 on each side of midrib) visible on both sides, the basal lateral nerves prominent and oblique ; underside often rusty hairy, 2$\frac{1}{2}$–4$\frac{1}{2}$ in. long, about twice as long as broad. Receptacles (figs) in pairs or single in leaf-forks ; stalk broad and thick, up to $\frac{1}{4}$ in. long, fruit (fig) globose or oval, often bluntly pointed at orifice, dotted or warted, $\frac{1}{2}$–$\frac{3}{4}$ in. diameter:—From Bateman's Bay (J. H. Maiden) to Northern Rivers, New South Wales.

Ficus stenocarpa F.v.M. A Sandpaper Fig. Resembling following species but the fruit are hairless. Leaves mostly hairless on underside, sometimes lobed on young growth. The sap of the bark of the stem is not milky. Fruit (receptacles) egg-shaped or globose, $\frac{1}{2}$–$\frac{5}{8}$ in. long.—Hunter River (Moore) to Atherton Tableland ; New Caledonia.

Ficus stephanocarpa Warb. Sandpaper Fig, Creek Fig. Bushy tree up to 50 ft. high. Leaves alternate, very harsh to the touch accounting for the name of Sandpaper Fig. Leaves often hairy on underside. Leaf-stalks $\frac{1}{8}$–$\frac{3}{8}$ in. long ; blades egg-shaped or elliptical in outline, sometimes oblique at base and margins occasionally toothed, 2$\frac{1}{2}$–5 in. long, 2–3 times as long as broad ; fruit (receptacles) oval, hairy, up to $\frac{3}{4}$ in. long.—Twofold Bay (Benth.) to Mackay.

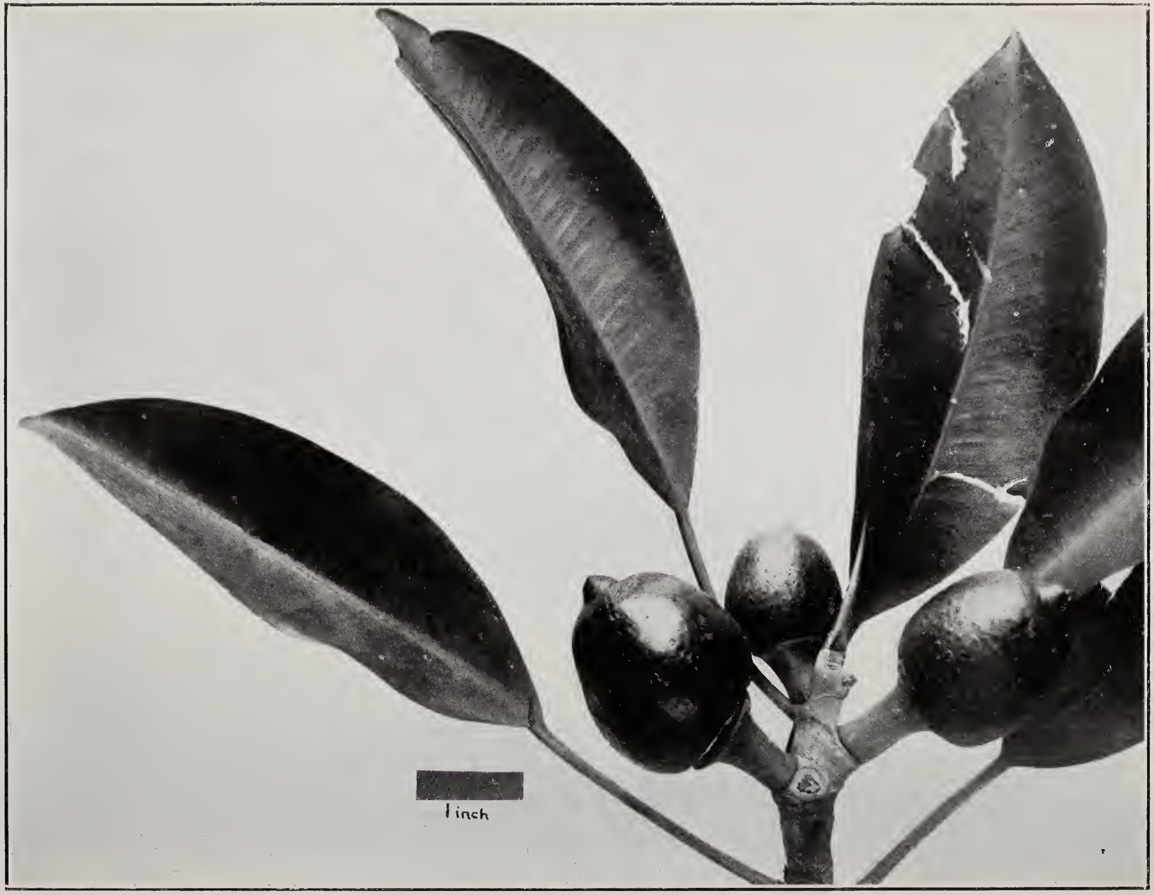

Fig. 33.—Ficus Watkinsiana. Fruit-bearing branchlet in fresh state. To the right of the base of the stalk of the lowest fruit the scar left by the stalk of a fallen fruit is shown.

(Photo.: Dept. Agric. and Stock, Brisbane.)

Family URTICACEAE.

Leaves and green parts often armed with stinging hairs .. .. .. 1. *Laportea.*
Leaves white or pale on underside, without stinging hairs .. .. 2. *Pipturus.*

1. LAPORTEA.

Laportea gigas Wedd. Giant Stinging tree, Fibrewood. Figs. 34 and 35.

Derivation.—Laportea, after M. Laporte ; Greek *gigas,* mighty.

Description.—A very large soft-wooded tree attaining a height of 120 ft. and a stem diameter of over 6 ft. Stem mostly prominently fluted or channelled. Bark grey, rather rough and scaly on large trees ; when cut, white or white tinted with pink, ⅝ in. thick on a tree with a stem diameter of 6 ft. Sapwood yellow. Young shoots, branchlets, and leaves covered with stiff, virulent, stinging hairs which almost disappear from the leaves of large trees. Leaf-stalks 1½ to 6 in. long. Leaves alternate, very large and broad, especially on the younger trees, the blade sometimes attaining as much as 1 ft. in length and 9 in. in breadth. heart-shaped in outline, margins regularly toothed on younger trees ; the leaves smaller and less toothed on the larger trees. Enclosing each young leaf is a stipule varying in length from ¾ to 1½ in. long and soon falling away. Flowers containing either male or female organs ; the sexes on separate trees. Flowers in inflorescences (panicles) in the forks of the leaves, the inflorescences much shorter than the leaves. The male flowers are about 1/20 in. in diameter and consist of an envelope of 4 minute segments (perianth segments) enclosing 4 stamens (each stamen opposite to a perianth lobe) and a rudimentary ovary in the centre of the flower. Female flowers small, consisting of an envelope of 4 segments (perianth segments), the 2 outer ones larger than the 2 inner ones. (In the absence of suitable material in the Queensland Herbarium the foregoing description of the flowers was adapted from that of Bentham, Flora Australiensis, vol. vi., p. 192). The fruit consists of a small round flattened nut about 1/16 in. broad surmounted by a small oblique style. The stalks of the nuts are expanded and fleshy, and form conspicuous fleshy masses of a pink or white colour.

Distribution.—From Imbil in the neighbourhood of Gympie, Queensland, to Tathra, in the neighbourhood of Bega, Southern N. S. Wales. The writer has seen the trees in the extreme localities mentioned.

Chemical.—Dr. J. M. Petrie, F.I.C., who investigated the tree chemically, concludes that its stinging property is due to the free, concentrated formic and acetic acids contained in the stinging hairs, which he found to be composed of silica (Proceedings Linnean Socy. N.S.W., vol. 31, pp. 530–545).

Note.—A figure illustrating a flowering twig of the species is reproduced by J. H. Maiden in his Forest Flora of N. S. Wales, vol. 8, p. 31, 1925.

Reference.—Laportea gigas Weddell in Arch. du Mus. ix., 129, tablets 3 and 4.

Laportea photiniphylla Wedd. Shining-leaved Stinging Tree, Mulberry-leaved Stinging Tree, Gympie, Fibrewood. Figs. 36 and 37.

Derivation.—Laportea, after M. Laporte ; photiniphylla, from Greek *photeinos* shining, *phyllon* a leaf (alluding to the glossy leaves).

Description.—A large soft-wooded tree attaining a height of 90 ft. and a stem diameter of 2 ft. 6 in. Stem not buttressed but in large trees often fluted or channelled. Bark of stem grey or light grey, scaly on the inner angles, the surface marked by scattered pustules. The bark on branches, branchlets, and roots whitish grey. When the bark is cut it is seen to be white streaked with dark red, measuring ½ in. thick on a tree with a stem diameter of 2 ft. 4 in. Branchlets thick. All parts of tree devoid of fine hairs, but the foliage and succulent parts are frequently armed with rigid stinging hairs which are often absent from adult trees and sometimes from young trees. Leaves alternate. Leaf-stalks ⅝–1¼ in. long. Leaf-blades egg-shaped in outline, frequently drawn out into a blunt but conspicuous point at the apex, margins entire, sinuate or saw-toothed ; midrib, lateral nerves, and net-veins visible on both surfaces in dried specimens, upper surface dark green and very glossy ; measurement of leaf-blades, 2½–5 in. long, about twice as long as broad. Flowers in inflorescences (panicles) springing from the forks (axils) of the leaves or from the scars of fallen leaves, the panicles 2–2½ in. long. Male and female parts in separate flowers, the flowers of each sex in separate panicles or on separate trees. Male flowers in globose or irregular groups of 12 or more, each flower stalkless, globose before expansion, when expanded 1/12–⅛ in. in diameter ; the outer part of the perianth membranous, divided into 4 lobes, each lobe egg-shaped in outline and about 1/24 in. long. On the inner side of the perianth are 4 stamens with their apices inflected in the bud, each stamen measuring about 1/18 in. long. Each

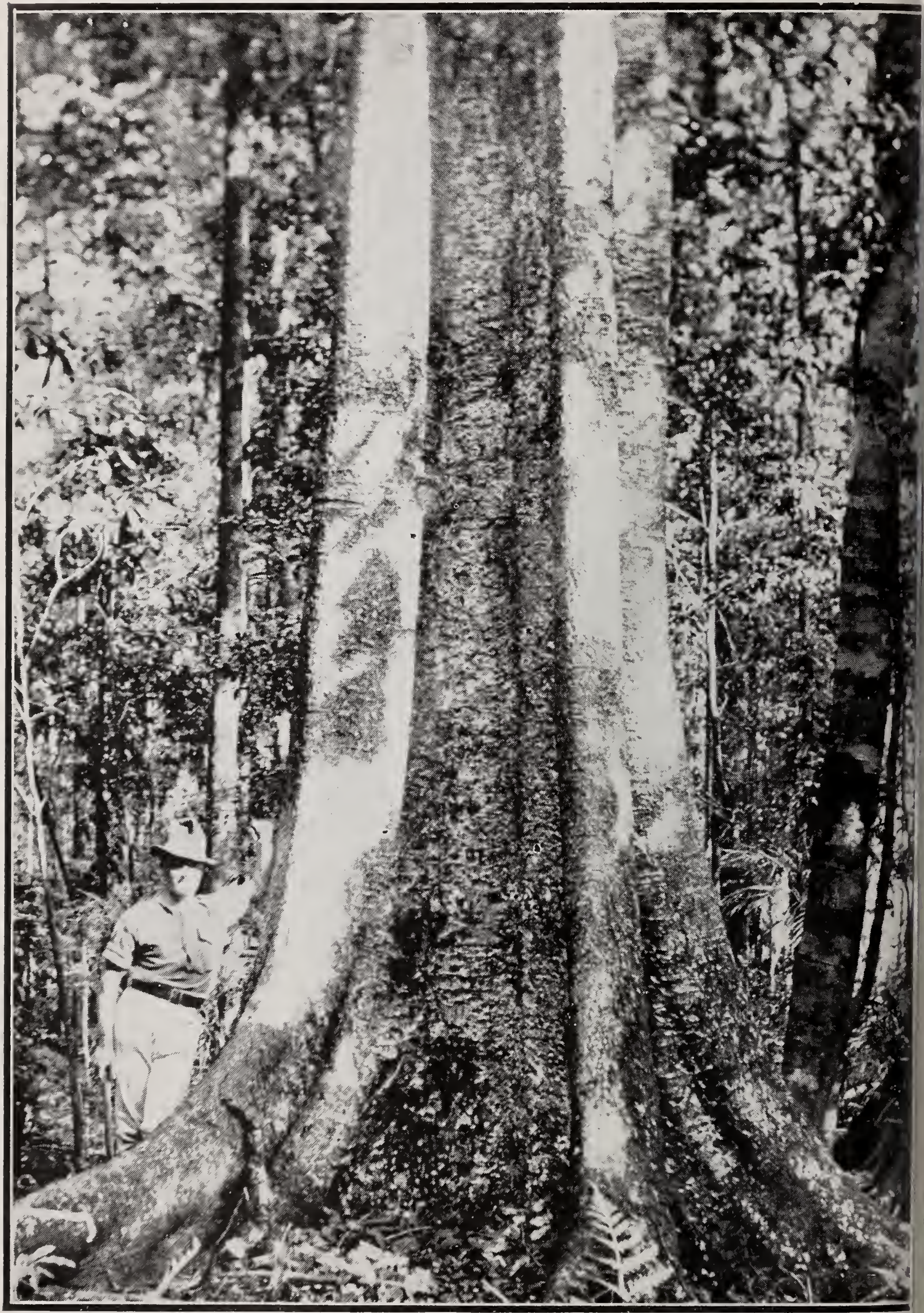

Fig. 34.—Giant Stinging Tree (*Laportea gigas*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

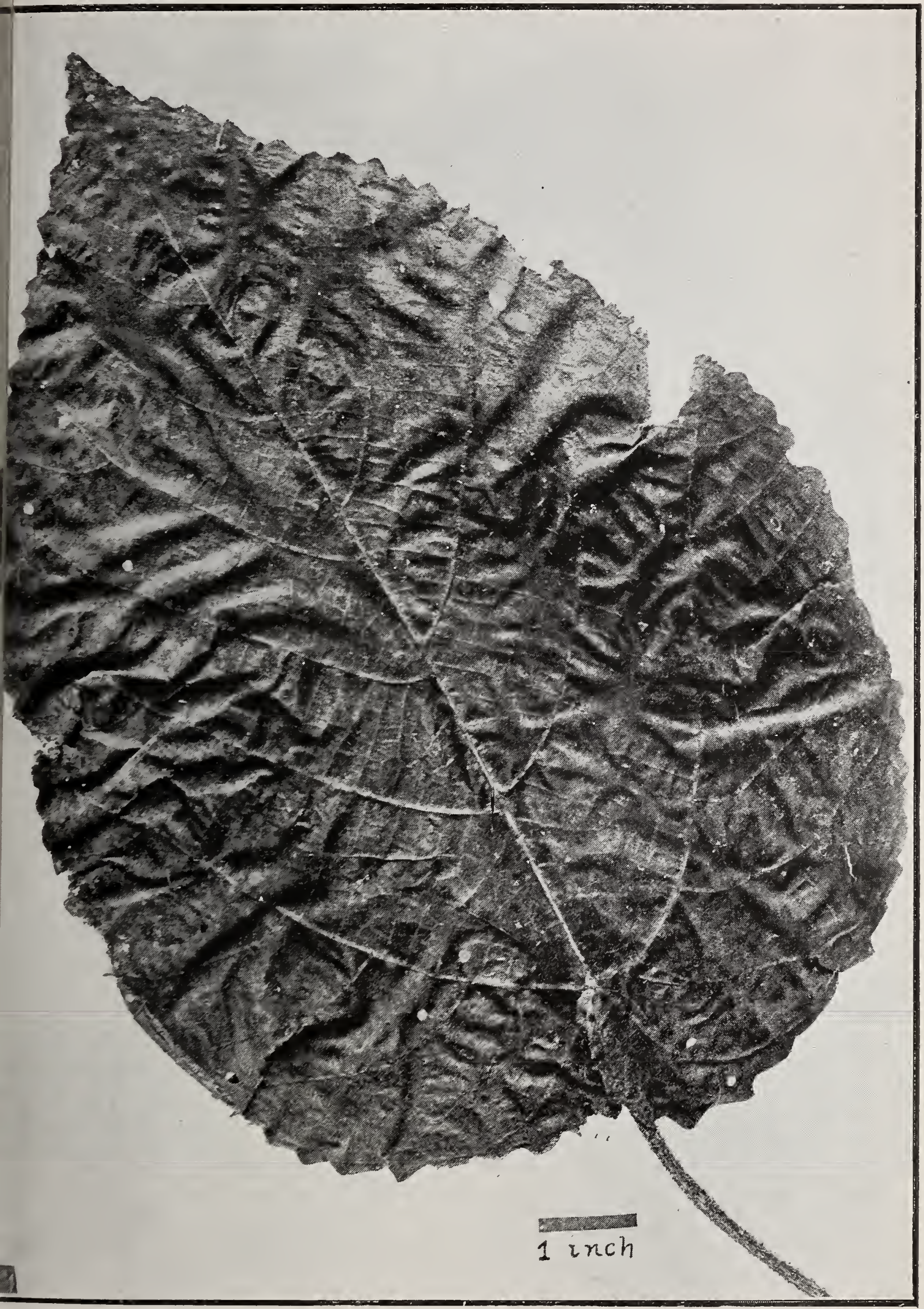

Fig. 35.—Leaf of Giant Stinging Tree (*Laportea gigas*). Dry state.
(*Photo.: Dept. Agric. and Stock, Brisbane.*)

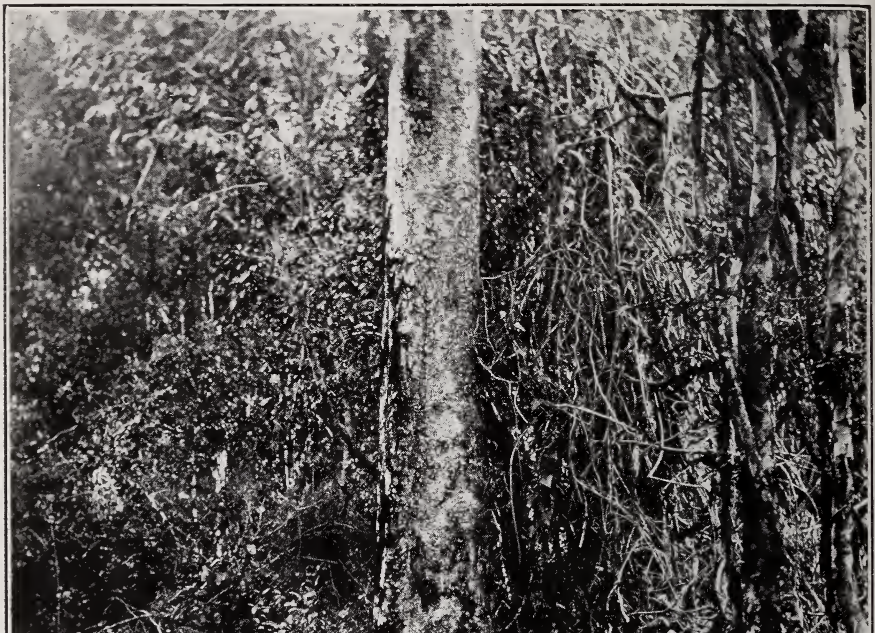

Fig. 36.—Shining-leaved Stinging Tree (*Laportea photiniphylla*). Nanango, about 26.6° S. The irregular depressions left by scales of shed bark are shown. Similar depressions are seen on the bark of large trees of *Laportea gigas* (see Fig. 34).

(*Photo.: W. D. F.*)

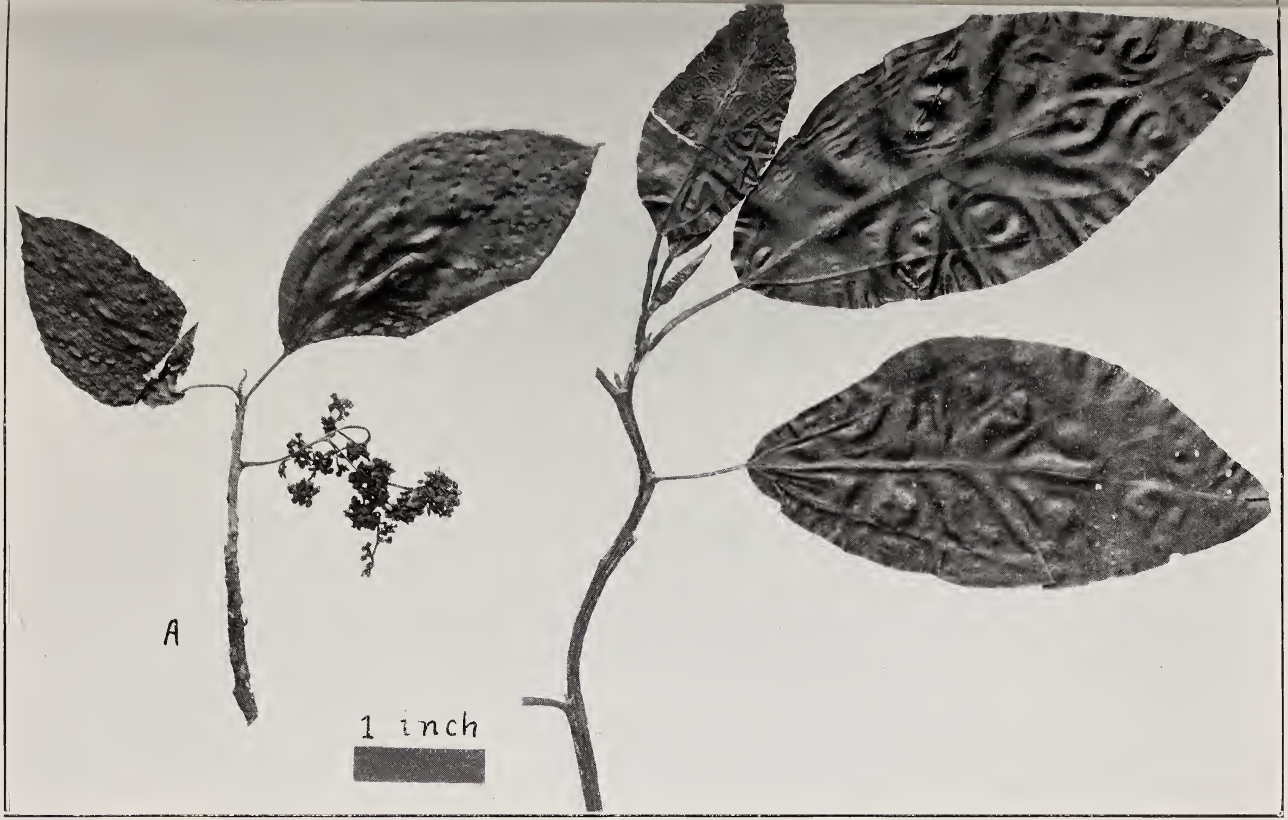

Fig. 37.—Shining-leaved Stinging Tree (*Laportea photiniphylla*). A, inflorescence-bearing branchlet. All in dry state. These specimens do not show the saw-toothed leaf margins which are sometimes prominent in this species.

(Photo.: Dept. Agric. and Stock, Brisbane.

stamen is situated opposite to a perianth lobe. In centre of the male flowers is a globose smooth body (? abortive ovary) about $\frac{1}{40}$ in. in diameter and containing a central depression at the apex. The female flowers are inserted on short fleshy stalklets about $\frac{1}{40}$ in. long; each flower measures $\frac{1}{12}$–$\frac{1}{8}$ in. long including the long single or forked style and is enclosed in a bag-like or flask-shaped perianth about $\frac{1}{20}$ in. long; the perianth consists of 4 lobes, two large broad ones opposite to one another and two very small ones alternating with the large ones; the style protrudes from the perianth. Fruit consisting of a disk-shaped or compressed nutlet about $\frac{1}{15}$ in. in diameter crowned by the hook-shaped style about $\frac{1}{15}$ in. long, the nutlet being borne on a fleshy stalklet about $\frac{1}{15}$ in. long. Flowering in March, June, and December.

Distribution.—Coastal scrubs from Bateman's Bay, South Coast of N.S.W. (C. Moore), to Atherton, North Queensland (C. T. White). One of the commonest trees in the rain forest on the ranges and foothills of the Sarina district, Queensland.

Reference.—*Laportea photiniphylla* Wedd., Monogr. Urtic. in Arch. Mus. Par. ix., 138, 1856.

Laportea moroides Wedd.—Stinging shrub. Does not attain tree size. Leaves similar in shape to those of *Laportea gigas* but can be distinguished from them by being mostly peltate. The leaf-stalk of *L. moroides* is generally inserted within the margin of the leaf whilst in *L. gigas* it is inserted in a sinus of the margin. The sting of this shrub is the most severe of the East-Australian nettles.—N. S. Wales (Maid. and Betche); Brisbane River to Barron River.

Pipturus argenteus Wedd. A shrub or small tree. Bark grey or brownish, dotted with numerous small pustules (lenticels). Leaves alternate, stalks 1–2 in., blades egg-shaped or broadly egg-shaped in outline, margins toothed, often very regularly saw-toothed, underside white, 3–5 in. long, 2–3 times as long as broad. Flowers in small globose groups arranged at intervals along slender inflorescence arising from forks of leaves.—Richmond River (Benth.) to Cape York. New Hebrides.

Family PROTEACEAE.

Fruit containing 1 or 2 seeds.
Fruit succulent, indehiscent.
Leaves simple, alternate. Flowers in racemes .. .. .. 1. *Helicia.*
Fruit scarcely succulent, splitting open on one side (follicular) except in *Hicksbeachia* and *Macadamia praealta.*
Leaves simple, approximated in groups (whorls) of 3 or 4, opposite or alternate. Seeds globose or semi-globose 2. *Macadamia.*
Leaves alternate (?), large, rigid, and divided into leaf-like lobes with rigidly toothed margins. Seed oval .. .. 3. *Hicksbeachia.*
Leaves simple or lobed, alternate, white or grey on underside. Flowers stalkless. Seed with thin wing at one end .. 4. *Orites.*
Leaves simple or much divided, alternate, sometimes white on underside. Seeds winged all round .. .. .. 5. *Grevillea.*
Fruit containing more than 2 seeds, splitting open on one side (follicular).
Leaves consisting of several leaflets or simple, alternate. Flowers red and conspicuous, crowded at ends of branchlets. Seeds prominently winged at one end, arranged in 2 series .. .. 6. *Embothrium.*
Leaves simple or deeply lobed. alternate. Flowers arranged in wheel-like umbels. Seeds prominently winged at one end .. .. 7. *Stenocarpus.*

1. HELICIA.

Helicia glabriflora F.v.M. Small tree. Leaves alternate, on stalks $\frac{1}{12}$ in. long. Leaf-blades lance-shaped, narrowed at each end, margins entire or distantly toothed, 2–4 in. long, 2–3 times as long as broad. Flowers in slender racemes. Fruit bluish, oval, outer part fleshy, about $\frac{1}{2}$ in. long.—Camden Haven (Benth.) to Eungella Range (west of Mackay).

Helicia ferruginea F.v.M. Small tree. Young branchlets and inflorescence densely rusty-hairy. Leaves alternate. Leaf-stalks $\frac{1}{8}$ in. long. Leaf-blades egg-shaped in outline, margins prominently toothed, veins on underside hairy, 3–5 in. long, 2–3 times as long as broad. Flowers in racemes. Fruit blue, oval, $\frac{1}{2}$ in. long, outer part fleshy.—Clarence River (Benth.) to Cairns.

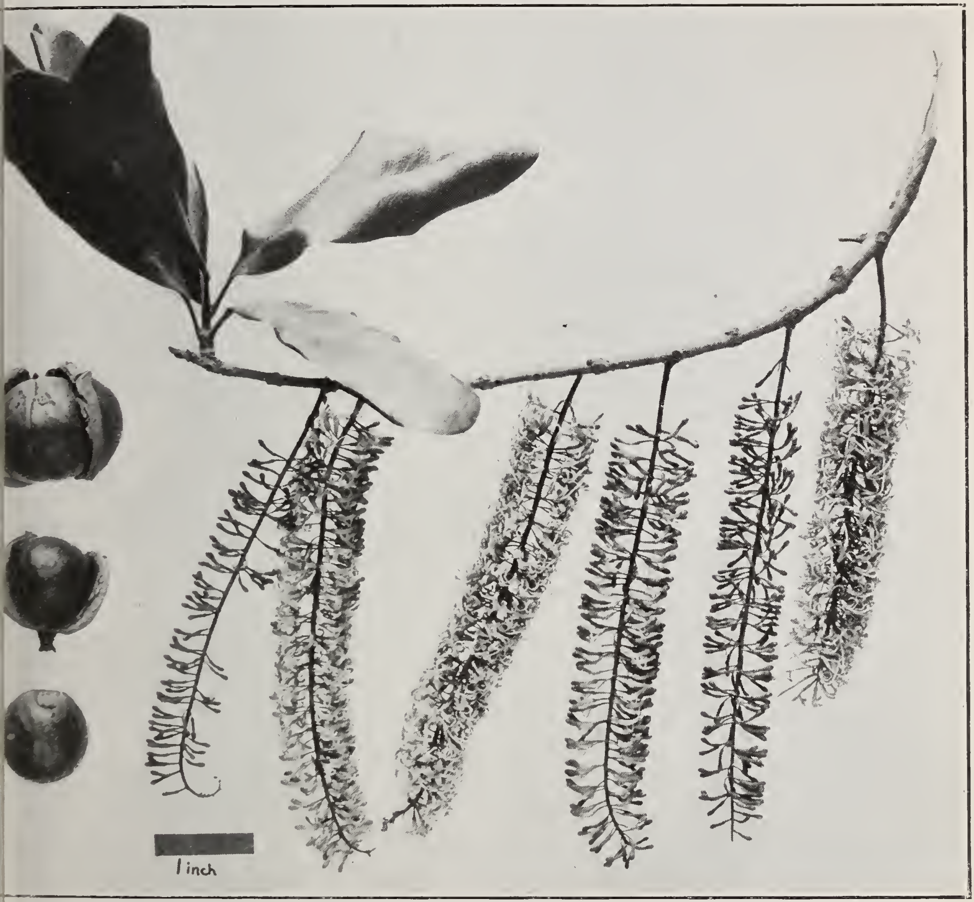

Fig. 38.—Bush Nut (*Macadamia ternifolia*). Flower-bearing twig. A (upper), two-seeded fruit; A (lower), one-seeded fruit; B, seed or nut.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

2. MACADAMIA.

Macadamia ternifolia F.v.M. Bush Nut, Queensland Nut, Nut Oak. Figs. 38-45.

Derivation.—Macadamia, in honour of John Macadam; ternifolia from Latin *terni* by threes, *folium* a leaf (alluding to the fact that the leaves are often arranged in threes on the branchlets).

Description.—A tree attaining about 60 ft. in height and a stem diameter of about 1 ft. Stem without buttresses. Bark rough but not wrinkled or furrowed, brown in colour, when cut dark red and measuring $\frac{3}{8}$ in. in thickness on a tree with a stem diameter of 1 ft. All parts of the tree hairless except the young shoots which are hairy, and parts of the inflorescence which bear a few minute hairs. Branchlets cylindrical, clothed with fairly numerous small raised dots (lenticels). Leaves arranged on the branchlets in groups (whorls) of 3, sometimes 2 or 4. Leaf-stalks $\frac{1}{5}$–$\frac{3}{5}$ in. long. Leaves rigid in texture, narrowly elliptical or very long and narrow, margins undulate, entire or divided into rigid and pungent teeth; midrib, lateral nerves, and very numerous fine net-veins conspicuous on both surfaces; measurement of leaf-blade, 3–9 in. long, from under 3 to over 4 times as long as broad. Flowers in long narrow inflorescences (racemes) springing from the forks (axils) of the leaves or from above the scars of fallen leaves on branchlets below the leaves; the racemes pendent and attaining 10 in. in length. The flowers are arranged along the racemes at fairly regular intervals. Stalklets of individual flowers $\frac{1}{6}$–$\frac{1}{8}$ in. long. The outermost part of the flower, the perianth, consists of 4 yellow narrow lobes $\frac{3}{10}$ in. long and $\frac{1}{24}$ in. wide which are rolled back as the flower expands. Situated on the inner side of each perianth lobe and adherent to it is a stamen consisting of a narrow anther about $\frac{1}{12}$ in. long. Within the perianth and situated in the centre of the flower is the ovary, which is egg-shaped and tapers very gradually into the style, which is club-shaped and thickened towards the apex. The ovary and style together measure about $\frac{3}{10}$ in. long. Surrounding the base of the ovary is a small ring about $\frac{1}{40}$ in. in height; this ring represents the united hypogynous glands. Fruit globose, green, 1 in. or more in diameter, the outer green part (pericarp) splitting open on one side (showing that the fruit is a follicle); the pericarp is about $\frac{1}{8}$ in. thick and encloses 1 globose seed or much less frequently 2 semi-globose ones. The seeds are commonly known as nuts; they consist of a very hard shell (the combined outer and inner seed-coats—the testa and tegmen) $\frac{1}{12}$–$\frac{1}{5}$ in. thick and the kernel or embryo (consisting of 2 large cotyledons and a minute almost globose body, the plumule and radicle, inserted between the 2 cotyledons at the lower end of the seed). Flowering period: September.

Distribution.—Scrubs from Camden Haven, N.S.W., about 25° S. (J. H. Maiden), to Maryborough, Queensland, 32° S.

References.—*Macadamia ternifolia* F.v.M., Transactions Philosophical Institute of Victoria, vol. 2, p. 72. J. H. Maiden (Forest Flora of N.S.W. vol. i., p. 217, 1904) states that the species named by him and E. Betche as *Macadamia integrifolia* is only to be regarded as a variety of *Macadamia ternifolia*. It might be questioned whether it is worthy even of varietal rank, as sharply toothed and quite entire leaves can sometimes be found on the same branchlets.

Uses.—The tree produces an edible and palatable nut.

Anatomy of Fruit of Macadamia ternifolia.—The writer* has described the anatomy of the fruit of this species. Figs. 38-45 illustrate the structure of the parts of which the fruit is composed.

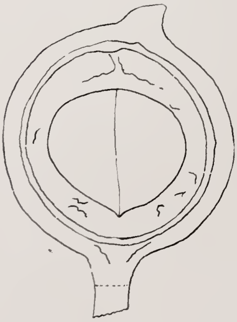

Fig. 39.

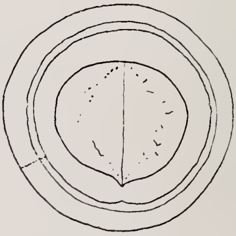

Fig. 40.

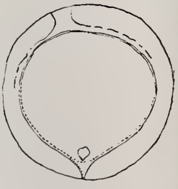

Fig. 41.

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* Francis, W. D.: The Anatomy of the Australian Bush Nut (*Macadamia ternifolia*); Proc. Roy. Soc. Q'land, 39, 43-52, 1928.

Fig. 39.—One-seeded fruit sectioned longitudinally in same plane as the opening suture of pericarp. The two layers of the pericarp are shown. The thick testa with a few irregularly sectioned vascular bundles surrounds the cotyledons which are shown as divided longitudinally. Two vascular bundles indicate the region of the hilum below the stylar projection. Natural size.

Fig. 40.—One-seeded fruit sectioned transversely. The opening suture of the pericarp is indicated by the dotted line on left. In the lowermost part of the figure the testa is shown as thinner than elsewhere. This part is situated on a line joining the hilum and micropyle. Transversely and obliquely cut vascular bundles are indicated in the cotyledons. Natural size.

Fig. 41.—Section of seed cut longitudinally along the line joining the hilum and micropyle. The position of the hilum is indicated by the two vascular bundles on the upper, left side. The position of the pale part of the tegmen is indicated by the dotted line, and the dark-brown part is represented diagrammatically by the continuous line. The plumule and radicle are situated just above the micropyle, the radicle pointing downwards towards the micropyle. The tegmen is strongly thickened in the region of the micropyle. Natural size. (Reprinted with permission from the writer's paper in Proc. Roy. Soc. Q'land, vol. 39.)

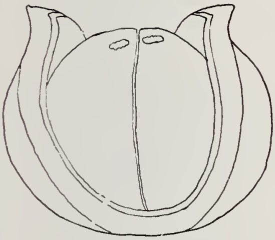


Fig. 42.

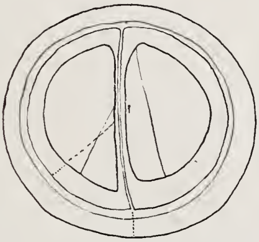


Fig. 43.

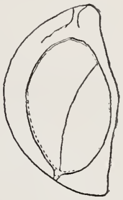


Fig. 44.

Fig. 42.—Two-seeded fruit. The two parts of the pericarp are shown. The two seeds, exposed by the opening of the pericarp, are shown in the middle of the figure. The two hila of the seeds are shown in the upper part. Natural size.

Fig. 43.—Transverse section through a two-seeded fruit. The dotted line through the pericarp on the lower side represents the opening suture. The dotted lines through the testa on each side indicate the position of the line along which the testa split in germination. The interrupted line passing through the two cotyledons of the seed on the left marks the plane through which the seed represented in Fig. 43 was sectioned. Natural size.

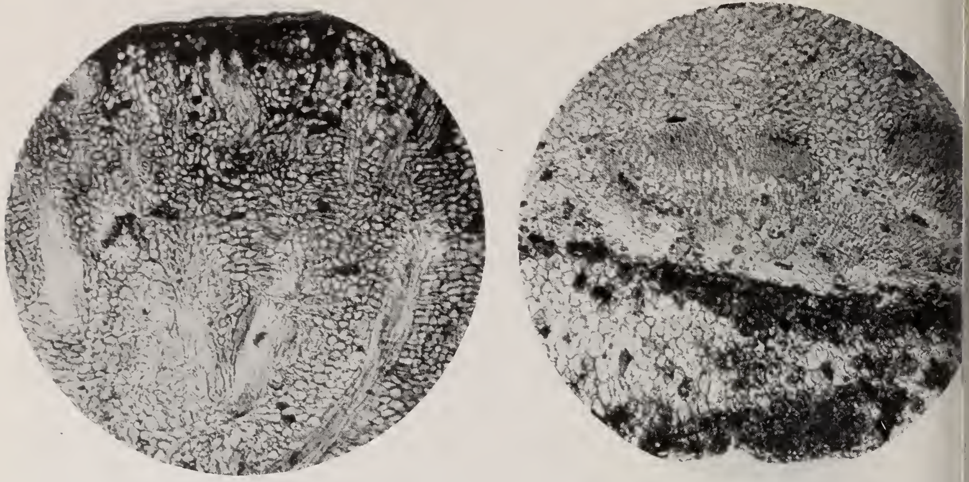
Fig. 44.—A seed of a two-seeded fruit cut longitudinally in the direction indicated in Fig. 43. The position of the hilum is indicated by the vascular bundles near the apex. The dotted line shows the position of the pale part of the tegmen and the continuous line represents diagrammatically the position of the dark-brown part of the tegmen. Natural size. (Reprinted with permission from the writer's paper in Proc. Roy. Soc. Q'land, vol. 39.)

Explanation of Figure 45.

1.—View of transverse-radial section, showing outermost part of pericarp, stained with Heidenhain's iron hæmatoxylon and safranin. The outermost dark band is the cuticle; beneath it the fine, light band represents the small-celled epidermis. Obliquely cut vascular bundles traversing parenchyma are the chief features of the picture.

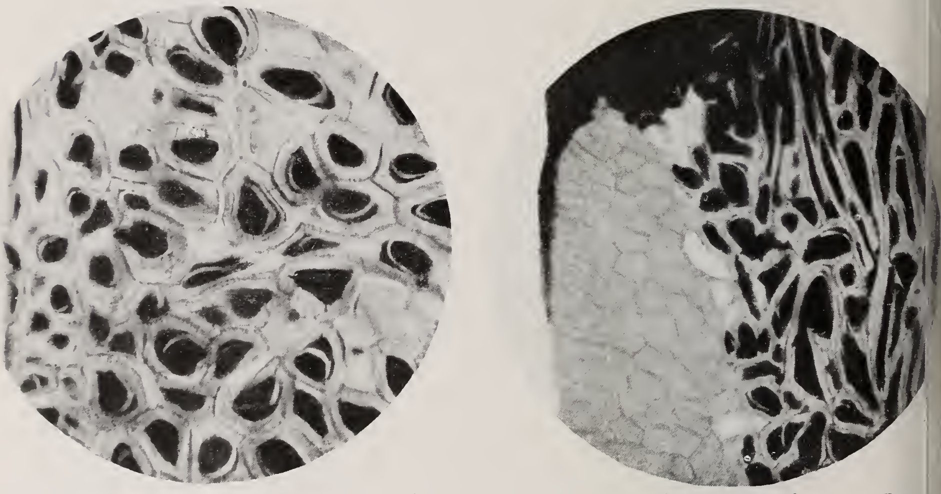
2.—View of the innermost part of the same preparation, which is partly shown above. The upper part shows the inner portion of the fibrous layer and three large vascular bundles in transverse section surrounded by parenchyma. The lower part of the picture depicts the entire width of the parenchymatous inner layer of the pericarp, which is separated from the outer layer by the cells with dark contents situated towards the middle of the picture.

3.—Longitudinal-radial section through combined testa and tegmen stained as in previous section. The outer, covering layer of compressed cells is depicted on the left. The lignified walls, abundantly pitted, and the cell inclusions are shown. This view is limited to the outermost part of the testa.



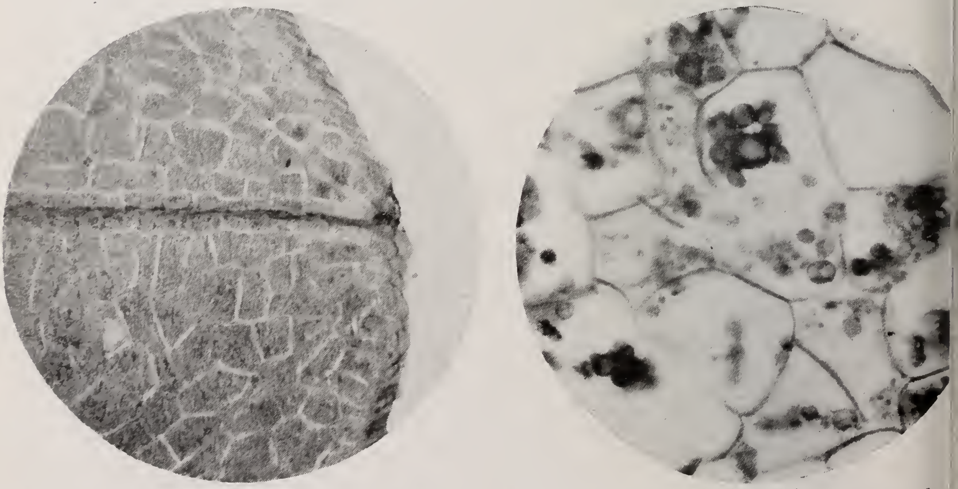
1. Outer part of pericarp. Transverse-radial. × 40.

2. Inner part of pericarp. Transverse-radia × 40.



3. Outer part of testa. Longitudinal radial. × 170.

4. Tegmen and inner part of testa. Long tudinal-radial. × 100.



5. Part of the two cotyledons. Transverse. × 170.

6. Tissue of cotyledon, showing proteinoplas × 380.

Fig. 45.—Anatomy of fruit of *Macadamia ternifolia.*

(Reprinted, with permission, from the writer's paper in Proc. Roy. Soc. Q'land, vol. 39.)

(*Photomicrographs: W. D. F.*)

4.—View of innermost part of same preparation, which is partly shown in 3. The innermost part of the testa and the junction of the lower and upper parts of the tegmen are shown. The reddish-brown or yellow contents of the cells of the testa are shown on the right. The granular cells of the lower part of the tegmen are shown on the left. The small, light areas marking the positions once occupied by crystals of calcium oxalate are indistinctly seen in the cells of the lower part of the tegmen. The very dark part of the picture on the upper left side represents the upper, dark-brown part of the tegmen, which is almost opaque. The dark-brown part of the tegmen is shown overlapping the lower, pale, part. This thin overlapping part is non-cellular.

5.—Section of part of two cotyledons, slightly obliquely cut, heated on a slide with equal parts of 1 per cent. alcoholic solution of Sudan III. and pure glycerine. The cutinised walls of the epidermal cells on the outside of the cotyledons and the cutinised outer walls of the epidermal cells between the cotyledons are deeply stained. In contrast the cellulose walls of the internal tissue are unstained. The oil present in the cells almost throughout the tissue is stained by the reagent.

6.—Section of internal tissue of cotyledon fixed with Carnoy's fluid and stained with Heidenhain's iron hæmatoxylon. The proteinoplasts are focussed in some of the cells. Towards the middle of the picture one proteinoplast with two protein grains is shown. The body of the proteinoplasts has stained more deeply than the contained protein grains.

Macadamia minor F. M. Bailey (Queensland Agric. Journ. 25, p. 11, 1910). Small-fruited Queensland Nut. Described by Bailey as a small tree or large shrub sending up many stems from the base. Branchlets, branches, and stems often dark grey or almost black. Leaves opposite or more frequently in groups (whorls) of 3 or 4, leaf margins mostly prickly-toothed, 1½–4½ in. long, 2–3½ times as long as broad. Racemes about 4 in. long. Individual flowers ⅙–¼ in. long. Fruit oval (or globose) up to 1 in. long, with a prominent beak or protuberance at apex.—Eumundi, south of Gympie.

Macadamia Lowii F. M. Bailey (Queensland Agric. Journ. 26, p. 127, 1911). Maroochie Nut. Shrub or small tree up to 15 ft. high and 2 or 3 in. stem diameter. Several erect or ascending branches often arise from a short stem near the ground. Bark often dark grey or almost black. Leaves opposite or more frequently in groups (whorls) of 3 or 4, leaf margins mostly toothed, blades 2½–7 in. long, 3–6 times as long as broad. Racemes (inflorescences) 5–6½ in. long. Fruit resembling that of *M. ternifolia* but mostly smaller and often somewhat oval, measuring up to 1 in. long; the fruit often has a prominent beak or protuberance at its apex. The fruit of this species or of *Macadamia minor* are not palatable in the same sense as that of *M. ternifolia* and they may be even poisonous, as White and Smith found a prussic-acid-yielding glucoside in the kernels of the nuts of this species or of *M. minor*.—Palmwoods to Gympie.

Note.—It is not clear to the writer how *Macadamia minor* and *M. Lowii* differ from each other. Both species could be regarded as small-fruited forms or varieties of *Macadamia ternifolia*. They also differ to some extent from *M. ternifolia* in having smaller leaves and unpalatable or perhaps inedible fruits.

Macadamia praealta F.M.B. Ball Nut, Opossum Nut, a Beefwood. Fig. 46.

Derivation.—Macadamia, in honour of John Macadam; Latin *praealta*, very high or tall.

Description.—A tree attaining a height of about 60 ft. and a stem diameter of about 1 ft. Stem not prominently buttressed. Bark brown, somewhat rough but not fissured. All parts hairless except a minute down on parts of the flowers. Leaf-stalks ¼–½ in. long. Leaves alternate, usually long and narrow, tapering at both ends; margins mostly wavy; midrib, lateral nerves, and net-veins visible on both surfaces; measurement of leaf-blade, 4–10 in. long, 4–6 times as long as broad. Flowers in narrow inflorescences (racemes) situated in the forks of the leaves or at the scars of fallen leaves, the racemes measuring 2-5 in. in length. Stalklets of the flowers forked, measuring ⅛–¼ in. long. Individual flowers measuring about ⅜ in. long; the outer part, the perianth, consisting of 4 very narrow lobes, as long as the flower, slightly expanded at the apex where each lobe bears a narrow anther about ⅛ in. long on the inner side. The ovary, in the centre of the flower, is egg-shaped, 1-celled, and tapers into a very slender style about as long as the perianth lobes. Fruit globular, attaining 2 in. in diameter, the outer shell-like part, often ¼ in. thick, enclosing 2 hemispherical seeds or 1 globular one. The seeds attain 1½ in. in breadth and are covered by two separable, thin, papery seed-coats. Flowering period: January–February; in fruit about June.

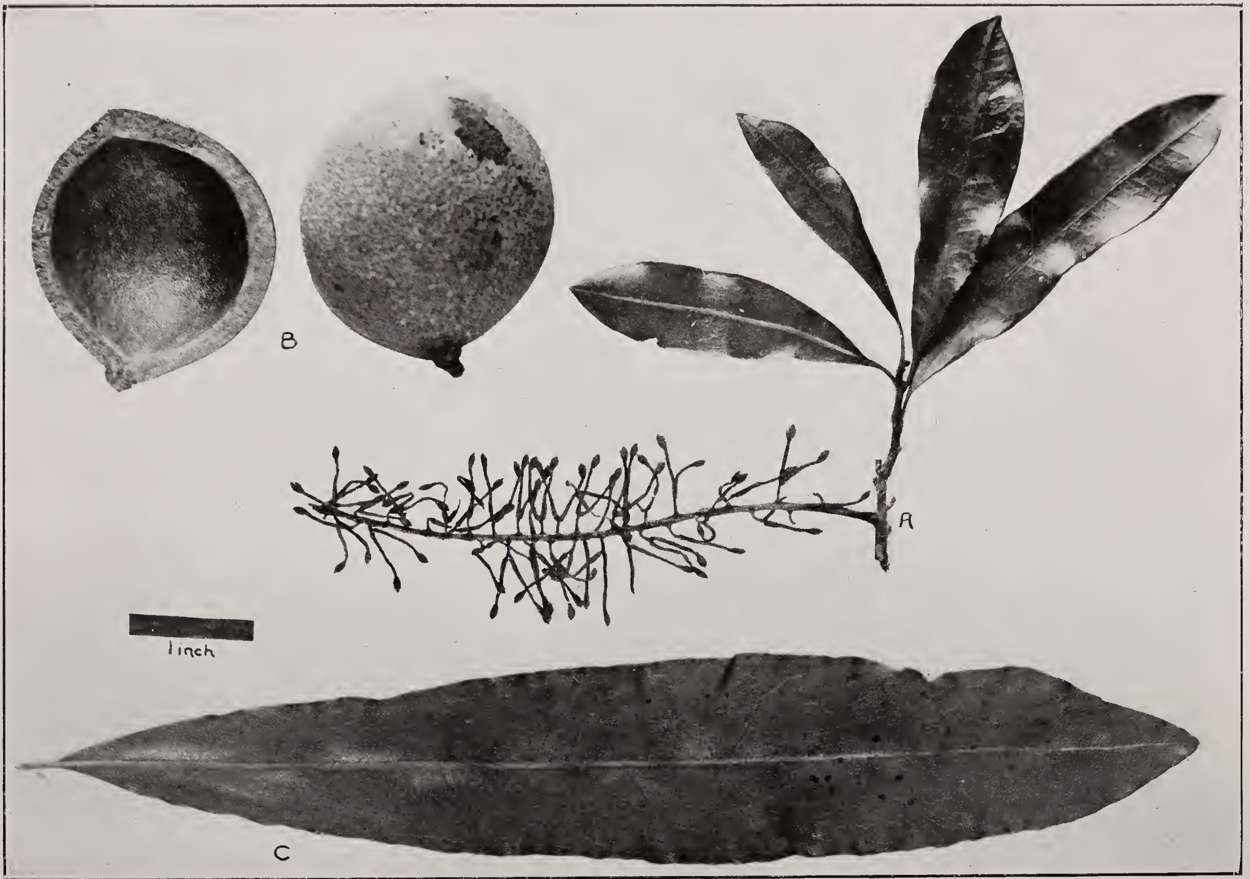


Fig. 46.—Ball Nut (*Macadamia praealta*). A, flower-bearing twig; B, fruit, on left the outer covering of fruit, split open, is shown; C, large leaf showing underside. All in dry state.

Distribution.—Scrubs of the coastal area from the Clarence River, N.S.W. (Bentham), to Gympie, Queensland.

Uses.—The timber could be advantageously used in cabinet work and indoor fittings. It is fairly durable and resembles Silky Oak in appearance.

References.—*Macadamia praealta* F. M. Bailey, Queensland Flora, vol. 4, p. 1330, 1901 ; *Helicia praealta* F. v. Mueller, Fragmenta Phytographiae Australiae, vol. iii., p. 37, 1862–1863.

3. HICKSBEACHIA.

Hicksbeachia pinnatifolia F.v.M. Tree 30 ft. high and 7 in. stem diameter (J. H. Maiden). Leaves very large, deeply lobed or divided into numerous leaflet-like lobes, rigid, margins rigidly toothed, veins impressed above and raised below. Flowers in long racemes. Fruit red, oval, hard, about $1\frac{1}{2}$ in. long ; kernel edible.—Bellinger River (Maiden) to Macpherson Range. Mt. Bartle Frere (North Queensland).

4. ORITES.

Orites excelsa R.Br. White Beefwood, Silky Oak, Prickly Ash (N.S.W.). Figs. 47 and 48.

Derivation.—Greek *oreites*, a mountaineer ; Latin *excelsa*, tall.

Description.—A tree attaining a height of about 100 ft. and a stem diameter of 2 ft. or slightly more. Stem not prominently buttressed at base. Bark grey or brown, fairly smooth ; when cut deep reddish brown, $\frac{5}{8}$ in. thick on a tree with a stem diameter of 2 ft. Sapwood white. Young shoots silky hairy. Leaf-stalks $\frac{1}{4}$–$\frac{2}{3}$ in. long. Leaves alternate, very narrow in outline, tapering towards the base and apex, margins coarsely toothed or entire, upper surface green, lower surface white or grey, lateral nerves and net-veins prominent on both surfaces ; measurement of leaf-blade, $3\frac{1}{2}$–8in. long, $3\frac{2}{3}$–7 times as long as broad. The leaves of barren shoots are often larger and deeply divided into 3 or 5 narrow, toothed lobes. Flowers in slender spikes springing from the forks of the leaves, the spikes generally shorter than the leaves. Individual flowers stalkless, in pairs along the spike, each pair when young enclosed in a concave bract which falls away before the flowers expand. Flowers about $\frac{1}{4}$ in. long, consisting on the outside of 4 narrow perianth segments. On the inner side of the perianth are 4 stamens, each stamen united for half its length to each perianth segment. The ovary, in the centre of the flower, has 4 glands at its base, is hairy, narrowly egg-shaped, and tapers into a narrow style. Fruiting follicle about 1 in. long, almost boat-shaped, woody, with a short fine point, containing 1 or 2 seeds. Seeds with a thin wing at the upper end about as long as the solid part. Length of seed about $\frac{2}{3}$ in. including the wing.

Distribution.—At high elevations in the scrubs of Macpherson Range, National Park, ranges about Killarney and Mt. Mistake. N. S. Wales as far south as the Hunter River (J. H. Maiden).

Uses.—The timber is used for cabinet-making.

Reference.—*Orites excelsa* R. Brown, Prot. Nov. 32.

5. GREVILLEA.

Grevillea robusta A. Cunn. Silky Oak, Southern Silky Oak. Figs. 49 and 50.

Derivation.—Grevillea, after C. F. Greville ; Latin robusta, robust.

Description.—A large tree attaining a height of about 120 ft. and a stem diameter of about 3 ft. Stem not prominently flanged. Bark dark grey or nearly black, furrowed or fissured ; when cut the outer dead bark is seen to be cork-like, intermediate layer reddish brown, innermost layer flesh-coloured ; measurement of bark, $\frac{3}{4}$ in. thick on a tree with a stem diameter of 2 ft. Young shoots and underside of leaves covered with a silky down. Leaves alternate, pinnate, divided into many (11–23) segments, the segments again divided or lobed ; the leaf segments are on stalks about $\frac{1}{4}$ in. long, are $1\frac{1}{2}$–3 in. long, and are divided into 3–7 narrow lobes. The seedling and coppice ("sucker") leaves are often divided into much smaller, narrower, and more numerous lobes than are the ordinary leaves. Flowers in long-branched inflorescences (panicles composed of several racemes) on branchlets below the leaves, or springing from the forks (axils) of the lower leaves or appearing terminal by the development of leaves on the lower part of the inflorescences. Individual flowers are on stalks about $\frac{1}{2}$ in. long, are bright yellow, are $\frac{1}{2}$–$\frac{3}{4}$ in. long. The outer part of the flower, the perianth, consists of 4 narrow segments $\frac{1}{4}$–$\frac{1}{2}$ in. long. Within the cancave apex of each perianth segment is an anther about $\frac{1}{20}$ in. long. The ovary (in the centre of the flower) is borne on a short stalklet $\frac{1}{8}$–$\frac{1}{12}$ in. long and is extended into a long bent or curved style. Follicles (fruit) boat-shaped, about $\frac{3}{4}$ in. long with a slender beak $\frac{3}{4}$–1 in. long. The follicles contain the seeds, which are flat and oval in outline, about $\frac{1}{2}$ in. long, and which are bordered by a thin wing. Flowering period : October.

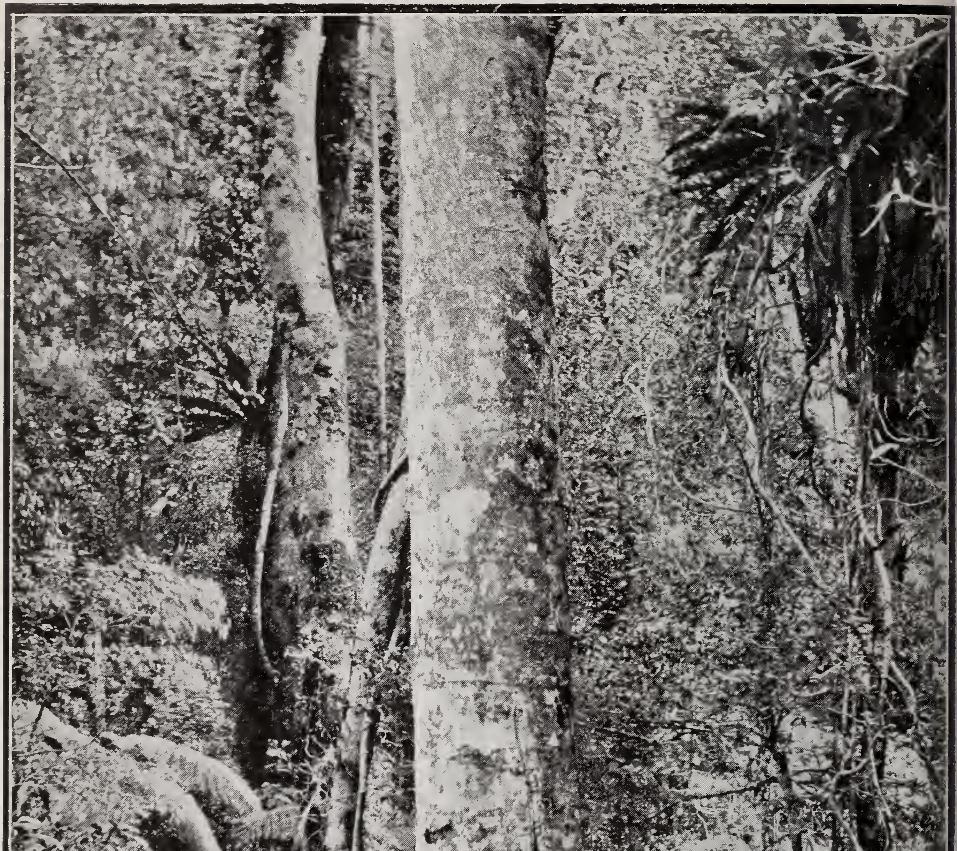


Fig. 47.—White Beefwood (*Orites excelsa*). Roberts Plateau, Macpherson Range, about 28.3 S. Bird's Nest Fern (*Asplenium nidus*) on upper right.

(*Photo.: W. D. F.*)

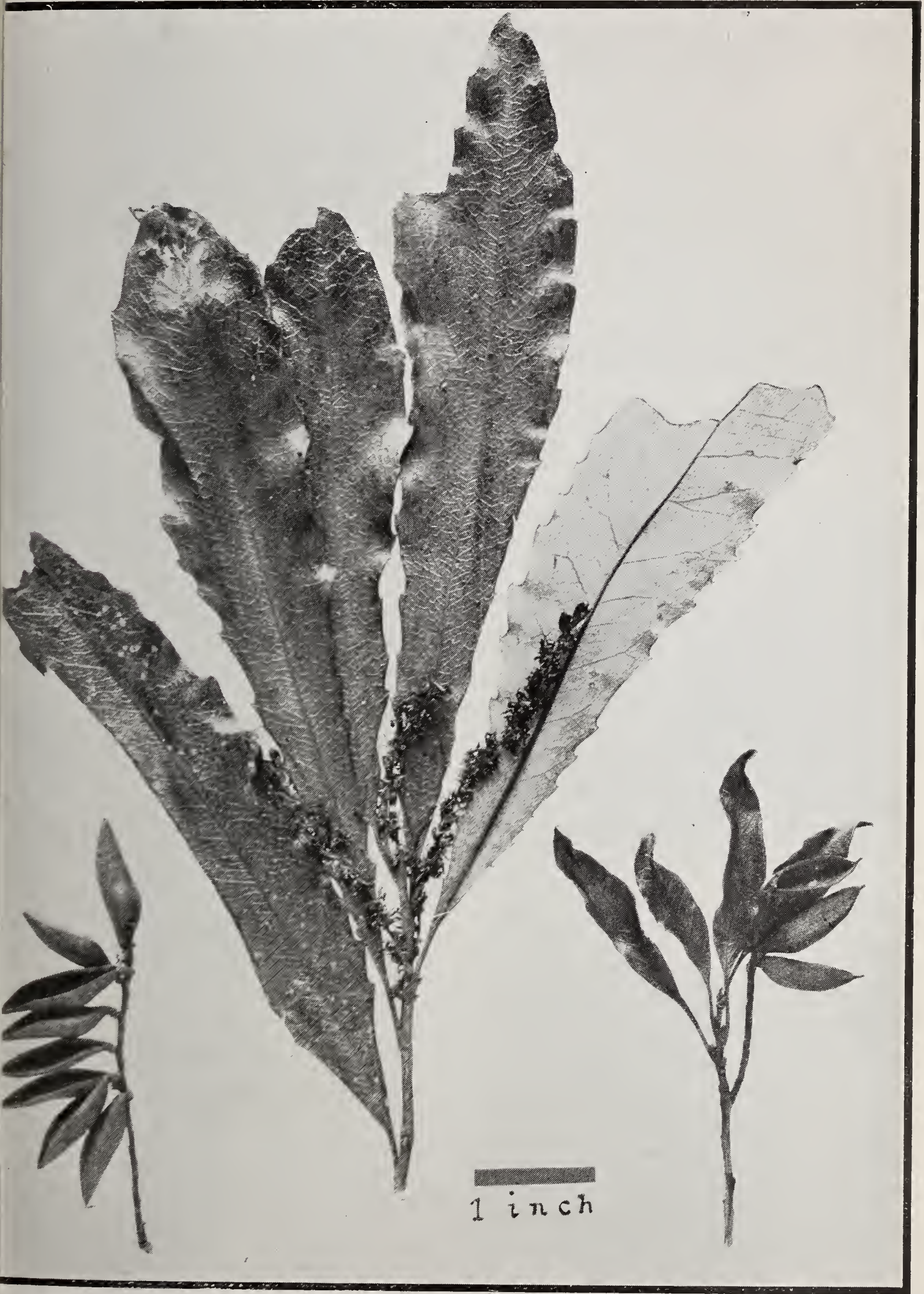


Fig. 48.—WHITE BEEFWOOD (*Orites excelsa*). Flower-bearing twig in centre; twigs bearing empty fruit cases (follicles) on left and right. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

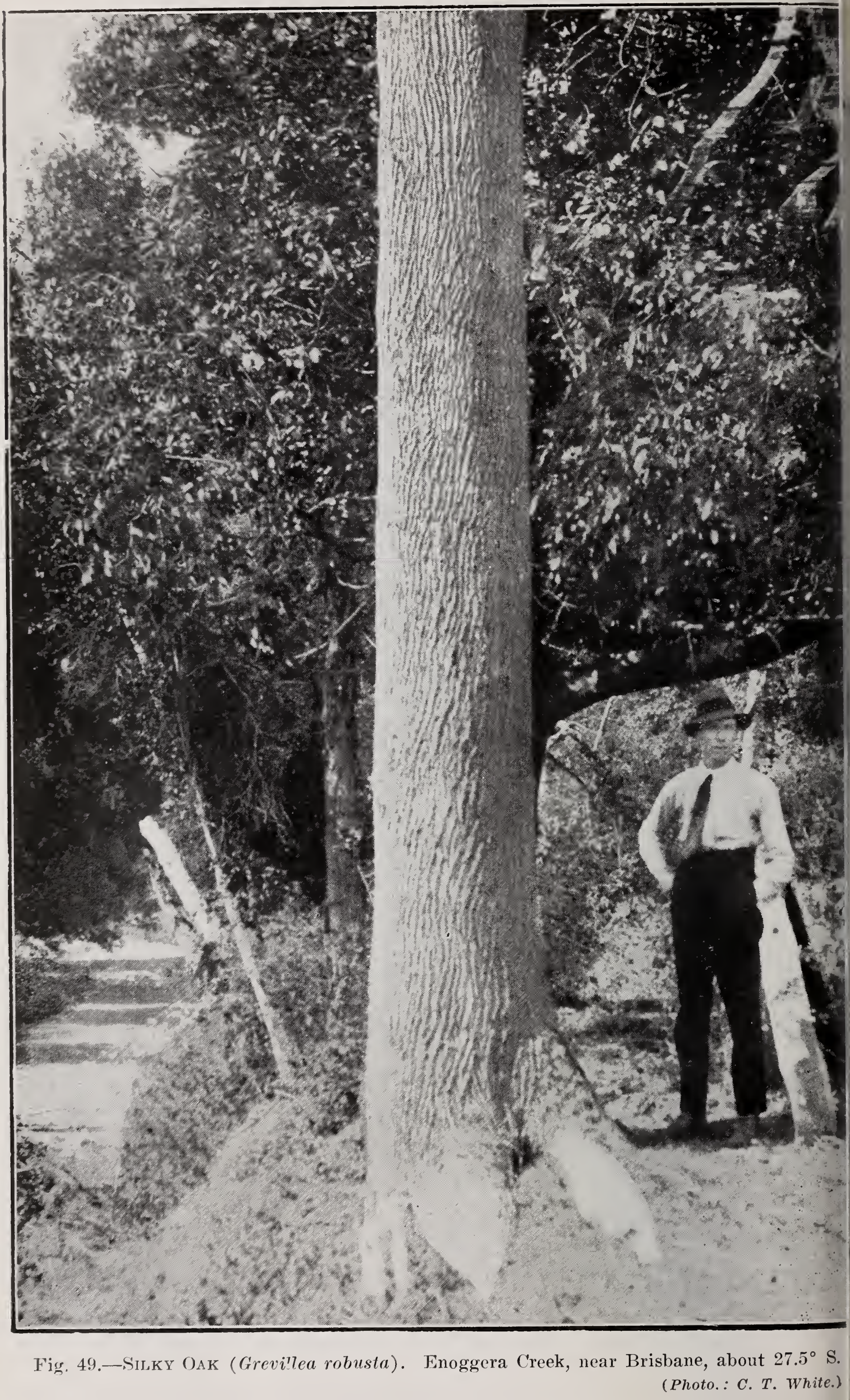


Fig. 49.—Silky Oak (*Grevillea robusta*). Enoggera Creek, near Brisbane, about 27.5° S.
(*Photo.: C. T. White.*)

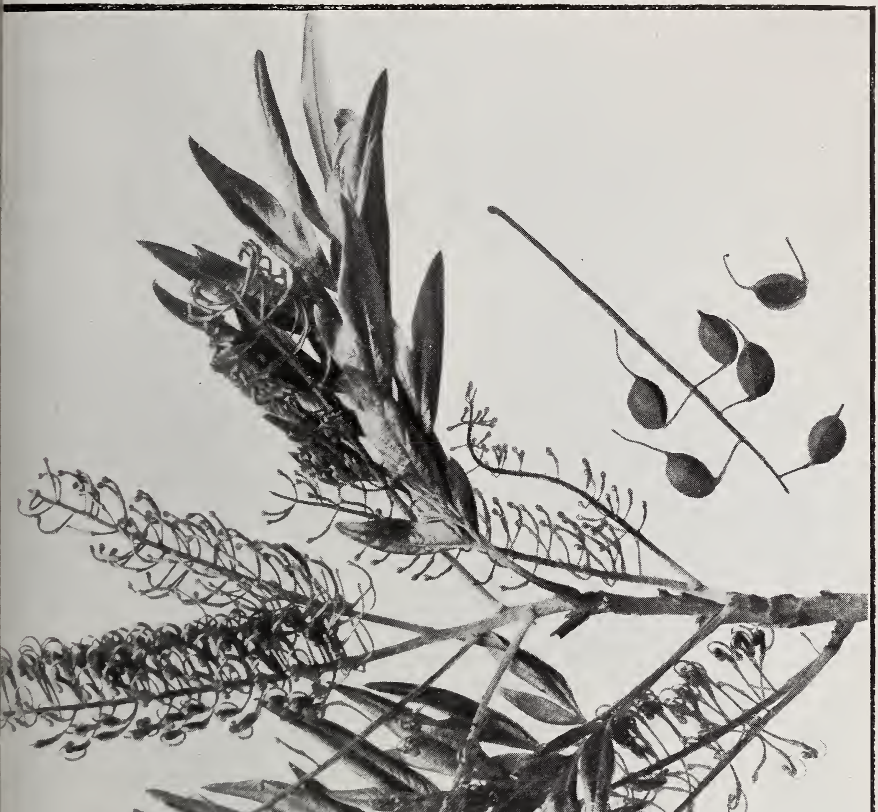


Fig. 50.—Silky Oak (*Grevillea robusta*). Flower-bearing branchlet. Twig with empty fruit cases (follicles) on right. From C. T. White's Text-book of Forest Botany.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

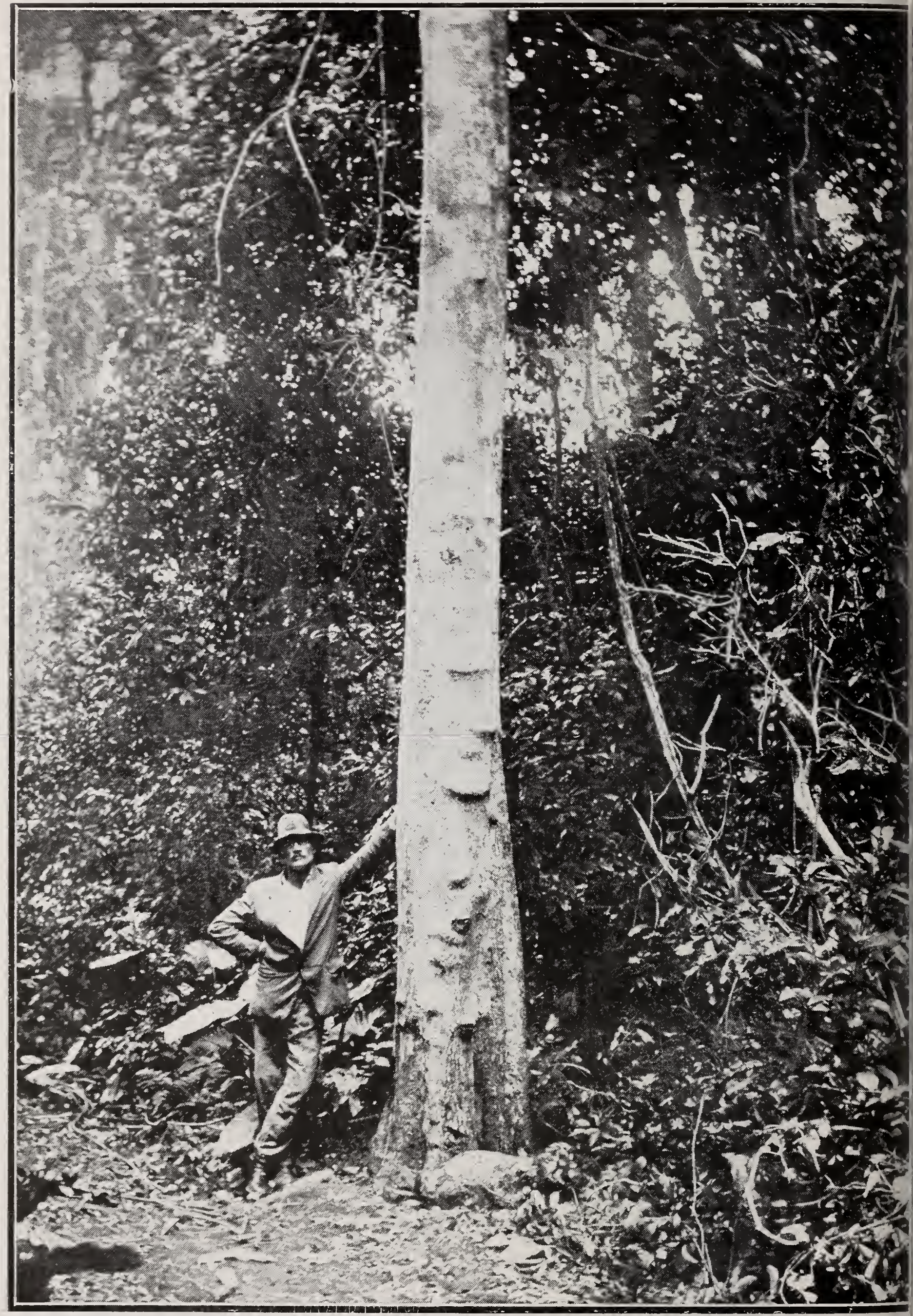


Fig. 51.—Wheel-of-Fire Tree (*Stenocarpus sinuatus*). Tambourine Mountain, about 28° S.

(*Photo.: W. D. F*

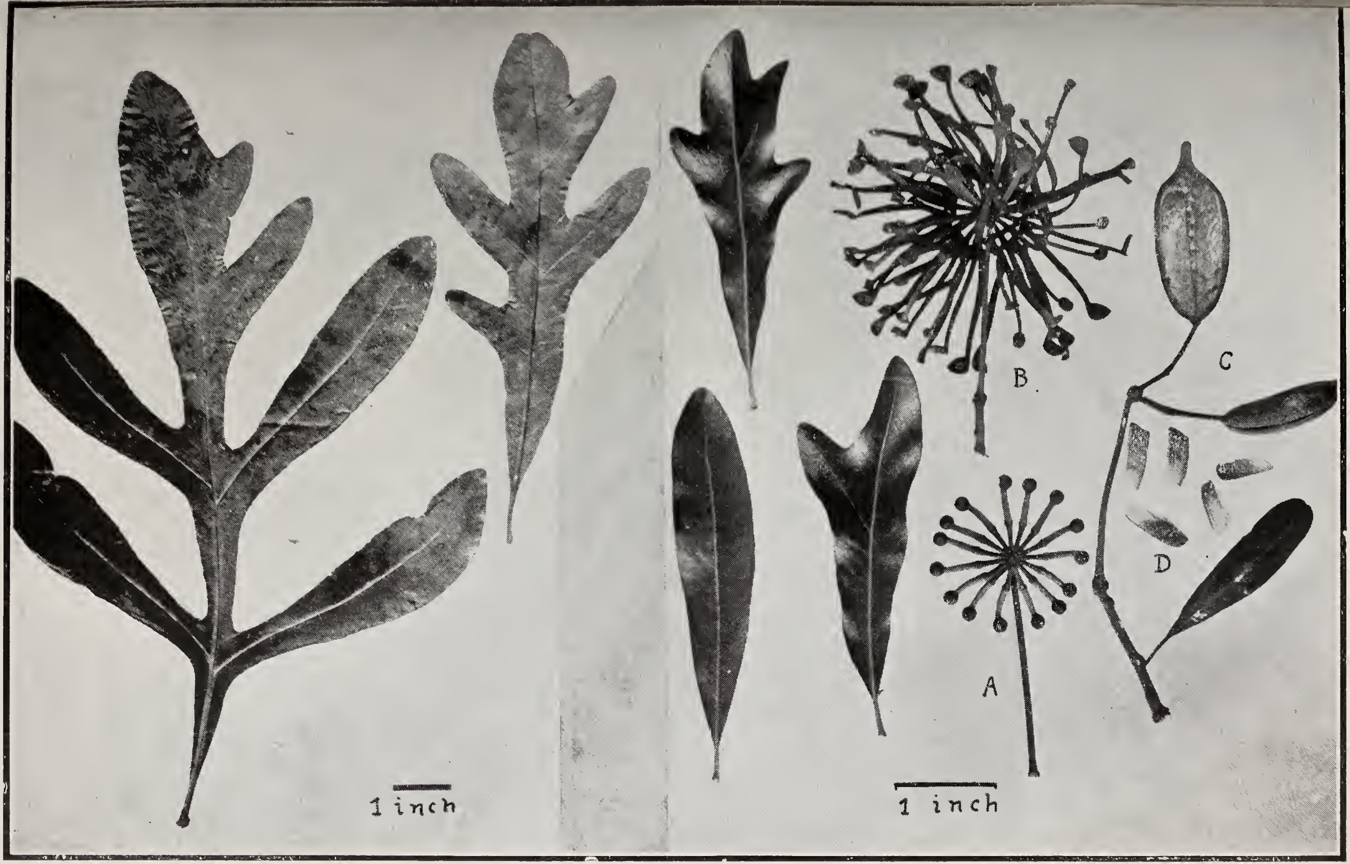


Fig. 52.—Wheel-of-Fire Tree (*Stenocarpus sinuatus*). A, part of inflorescence (umbel) in bud stage; B, part of inflorescence (umbel) in flowering stage; C, empty fruit cases (follicles); D, seeds. Different forms of leaves on left, two of which are from C. T. White's Forest Botany. (*Photo.: Dept. Agric. and Stock, Brisbane.*)

Distribution.—Scrubs from Clarence River, N.S.W. (J. H. Maiden), to Maryborough, Queensland. It extends inland as far as the Bunya Mountains (about 100 miles from the coast).

Uses.—When the trees were plentiful the timber was used for cabinet-making. The most conspicuous feature of the wood is its prominent rays. The trees grow rapidly and are cultivated for ornamental purposes.

Reference.—*Grevillea robusta* A. Cunningham in R. Brown's Prot. Nov. 24.

Grevillea Hilliana F.v.M. A tree attaining 90 ft. in height and stem diameter of 1 ft. Leaves alternate, generally exceeding 5 in. in length, entire or very deeply lobed, white and silky on underside. Flowers in long racemes. Fruit hard and flattened, egg-shaped, splitting open on one side, about 1 in. long. The variation and form of the leaves are similar to those of *Stenocarpus sinuatus.* Wood hard and heavy, dark brown or pale, rays prominent, soft tissue arranged in conspicuous bands at right angles to rays.—Clarence River (C. Moore) to Cairns, North Queensland.

6. EMBOTHRIUM.

Embothrium Wickhamii F.v.M., var. **pinnata** Maid. & Betche. Maiden (For. Flora N.S.W., 5, 93) states that this variety attains 60–80 ft. in height and 5 ft. stem diameter on the Dorrigo. Stem not buttressed. Bark brown, more or less rough with small pustules, when cut deep red, ⅜ in. thick on tree with stem diameter of 1 ft. 10 in. Leaves alternate, simple or pinnate. Simple leaves 5 in. or more in length, tapering very gradually towards each end, base gradually narrowed into a very long stalk; leaflets similar in shape to simple leaves. Flowers crowded at ends of branchlets, red and conspicuous, stalklets of individual flowers almost 2 in. long. Fruit woody, almost cylindrical, 3–4 in. long including a long beak, splitting open on one side. Seeds arranged in 2 series, each seed with a thin flattened wing 1¼ in. long and almost ½ in. wide.—Dorrigo to Macpherson Range.

7. STENOCARPUS.

Stenocarpus sinuatus Endl. Wheel of Fire, White Beefwood, Tulip Flower, White Oak. Figs. 51 and 52.

Derivation.—Stenocarpus from Greek *stenos* narrow, *karpos* fruit (referring to the slender fruit of some species); Latin *sinuatus*, curved (referring to the wavy margins of the leaves).

Description.—A tree attaining a height of about 100 ft. and a stem diameter of about 1 ft. Stem not buttressed, at least in South Queensland specimens. Bark dark grey to dark brown, wrinkled; brown when cut, and measuring ¼ in. thick on a tree with a stem diameter of about 1 ft. Sapwood white. Young shoots and parts of the flowers downy with rust-coloured hairs which are often minute on parts of the flowers. Leaf-stalks ½–1 in. long. Leaves large, alternate, very variable in shape, margins mostly wavy, texture fairly thick and rigid, glossy above with the midrib, lateral nerves, and a few net-veins visible, paler on the underside where numerous very fine net-veins are visible. The undivided leaves are narrow, blunt at the apex, narrowed towards the base; measurement of leaf-blades, 5–8 in. long, 3–4 times as long as broad. Other leaves are more or less deeply lobed on the margins, the lobes varying in number, length, and shape. Flowers bright red and very conspicuous, disposed at the ends of branchlets or in the forks of the leaves or springing from the scars of fallen leaves; arranged in regular wheel-like clusters (umbels) which are borne on stalks from 1½–3 in. long, 1 or several of the stalks springing from the same part of the branchlet. There are 10–14 flowers in the wheel-like umbels, each flower on a stalklet about ⅜ in. long. The individual flowers are slender; before they finally expand they measure about 1¼ in. long and bear a globular expansion about ¼ in. diameter at their apices. The expanded flower consists of 5 slender parts, the 4 outer ones are the perianth segments and the central or inner one is the stalked ovary. The perianth segments are dilated at the apex where each bears an anther about ⅛ in. long. The slender central organ bears the ovary at about half its length at a spot where there is a patch of minute hairs, and the disc-shaped stigma at its apex. The fruit (a follicle) is dry and almost boat-shaped and after maturity flattens out; it measures 2–4 in. long and 1 or more inches wide, and contains numerous thin, flattened, overlapping seeds measuring about 1 in. long and $\frac{3}{10}$ in. broad. Flowering period about February.

Distribution.—Coastal scrubs of Queensland and N. S. Wales from the Bellinger River, N.S.W. (J. H. Maiden), to Atherton, North Queensland.

Uses.—The timber could be used advantageously for cabinet-making. On account of its brilliant and remarkably symmetrical inflorescence the tree is often cultivated.

Reference.—*Stenocarpus sinuatus* Endlicher, Genera Plantarum, Supplement iv., 88, 1847.

Stenocarpus salignus R.Br. Scrub Beefwood ; the timber is sometimes called "Silky Oak" in the trade. Figs. 53 and 54.

Derivation.—Stenocarpus from Greek *stenos* narrow, *karpos* fruit (alluding to the slender fruit of some species) ; Latin *salignus*, willow-like.

Description.—A tree attaining a height of about 90 ft. and a stem diameter of 2 ft. Stem sometimes buttressed at the base. Bark brown, often finely wrinkled or striated ; when cut pinkish brown, measuring $\frac{3}{16}$ in. thick on a tree with a stem diameter of 2 ft. All parts except the ovary and its stalk hairless. Leaf-stalks $\frac{1}{5}$–$\frac{1}{3}$ in. long. Leaves alternate, elliptical, narrowed towards each end, the midrib and a nerve on each side of it traversing nearly the whole length of the leaf, with a few looping veins between them (see botanical note below) ; measurement of leaf-blade, 3 to nearly 5 in. long, 3–5 times as long as broad. Flowers white or greenish white, in dense nearly spherical clusters (umbels) at the ends of slender stalks measuring about 1 in. or more in length, the umbel-bearing stalks either single or several together at the ends of branchlets or in the forks of the leaves. There are about 15–30 flowers in each umbel and they are borne on stalklets $\frac{1}{4}$–$\frac{1}{3}$ in. long. The individual flowers measure about $\frac{1}{3}$ in. long before they finally expand, bear a globular expansion about $\frac{1}{12}$ in. in diameter at their apices, and consist of 5 narrow parts. The 4 outer and shorter parts are the perianth segments ; they are narrow and flattened. The inner longer part bears the ovary, is cylindrical and curved, the middle protruding between the perianth segments before the apex is released by the perianth segments. The ovary is situated at about the middle of this slender curved organ, which is expanded into a lateral disk-shaped stigma at the apex. There are 4 anthers in each flower, 1 anther is borne by each perianth segment within its expanded apex, each anther measuring about $\frac{1}{24}$ in. long. Fruit 2–4 in. long, opening along one edge and flattening out to about $\frac{1}{4}$ in. wide, containing numbers of very thin, flattened, narrowly oblong seeds about $\frac{1}{2}$ in. long and $\frac{1}{10}$ in. broad, separated from one another by a thin membrane the same shape as the seeds. Flowering period : October, January.

Distribution.—Coastal scrubs of Eastern Australia from Illawarra, N.S.W. (Bentham), to National Park (Macpherson Range), Queensland.

Uses.—Mr. R. T. Baker states that the timber could be used for the heavier parts of carriages, waggons, and heavy cabinet work, also for turnery and other uses where a decorative timber is required (see Baker's Hardwoods of Australia, p. 353, 1919).

Botanical.—There appears to be a considerable amount of variation in this species. In some cases there are 1 or 2 longitudinal nerves on each side of the midrib, in others these nerves are suppressed and the leaves are penninerved. Sometimes the reticulate veins are obscured. Bentham recognises two varieties as under :—

Var. **Moorei.** Leaves broader than the typical form with 1 or 2 longitudinal nerves on each side of the midrib, ovary minutely hairy.—Illawarra ; Mt. Warning (with some of the leaves deeply divided into 3 or 5 narrow lobes) ; Mt. Lindsay, Rockingham Bay.

Var. **concolor.** Leaves with 1 or rarely 2 longitudinal nerves on each side of the midrib and more prominent net-veins. Ovary hairless.—Broadsound and Maryborough.

Reference.—*Stenocarpus salignus* R. Brown in Transactions of the Linnean Society, vol. 10, p. 202.

Family NYCTAGINACEAE.

Pisonia Brunoniana Endl. As Maiden and Betche (Census of N.S.W. Plants, p. 73) have listed this species it apparently occurs in subtropical Australia. The trees seen by the writer in tropical Queensland attain about 60 ft. in height and 2 ft. 6 in. stem diameter ; stems often fluted, bark slightly rough, and wood very soft. The soft wood and general aspect of the tree resemble those of *Laportea gigas*. Leaves approximated in groups of 2–5 at the nodes or alternate, soft and faintly nerved, lance-shaped or egg-shaped in outline, 5 in. or more in length. Fruit narrow, attaining 1$\frac{1}{2}$ in. in length, 4–5 angled, often exuding a dark, treacle-like, very viscid gum.—Illawarra (Benth.) to Mulgrave River ; Papua ; Norfolk Id. ; New Zealand.

Family PHYTOLACCACEAE.

Codonocarpus australis A. Cunn. Bellfruit tree. Small, cone-shaped tree attaining 30 ft. in height. Leaves alternate ; stalks $\frac{1}{2}$ in. long ; blades lance-shaped, tapering into a long, attenuated point and narrowed gradually into stalk, venation obscure, 2–3 in. long, 4–8 times as long as broad. Fruit-stalks 1$\frac{1}{2}$ in. long ; fruit bell-shaped, $\frac{3}{4}$ in. long, consisting of 40–50 carpels. Common as secondary growth in felled, subtropical rain forest.—Hunter River (Maiden) to Gympie.

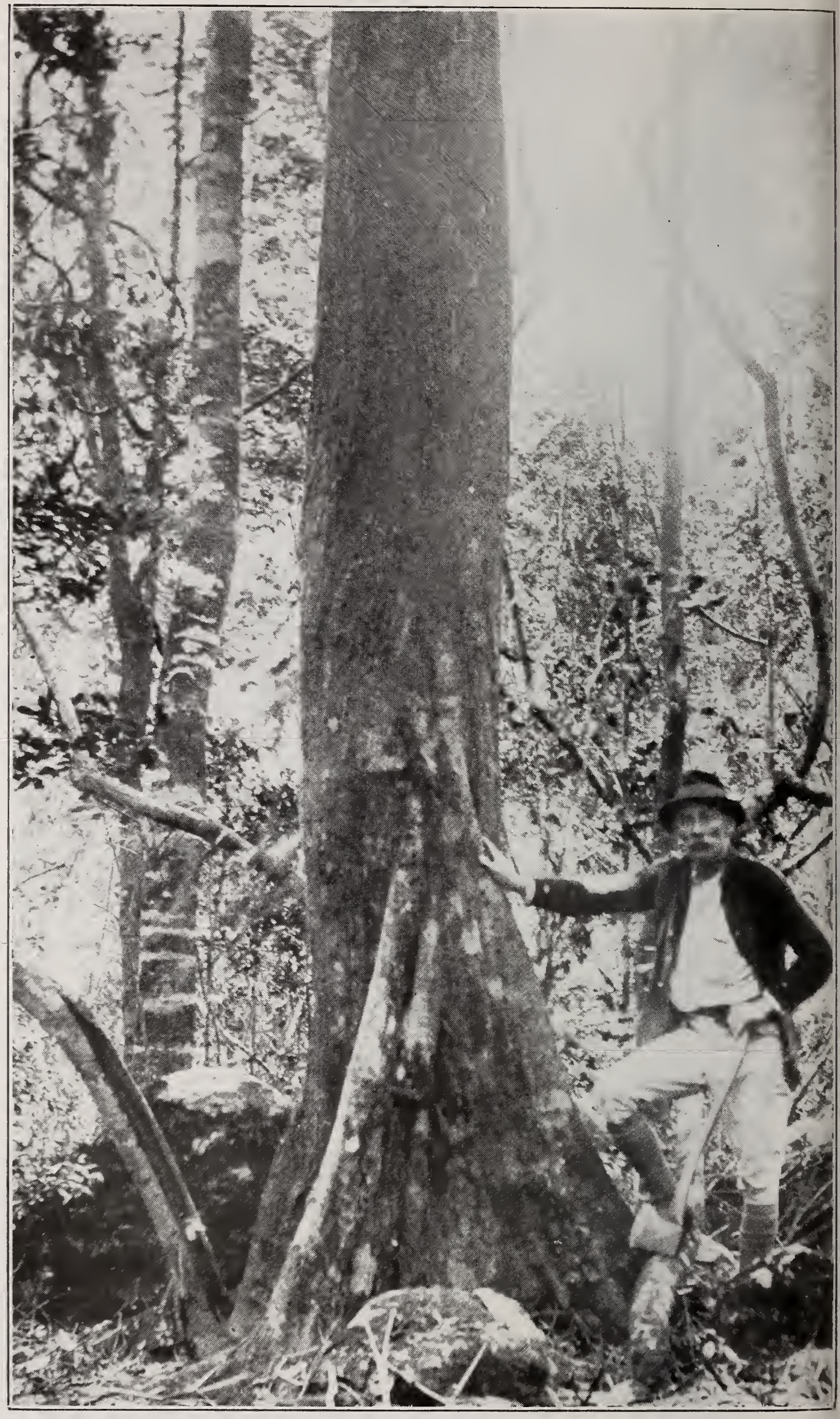


Fig. 53.—Scrub Beefwood (*Stenocarpus salignus*). Roberts Plateau, Macpherson Rang about 28.3° S.

(*Photo.: W. D. F.*)

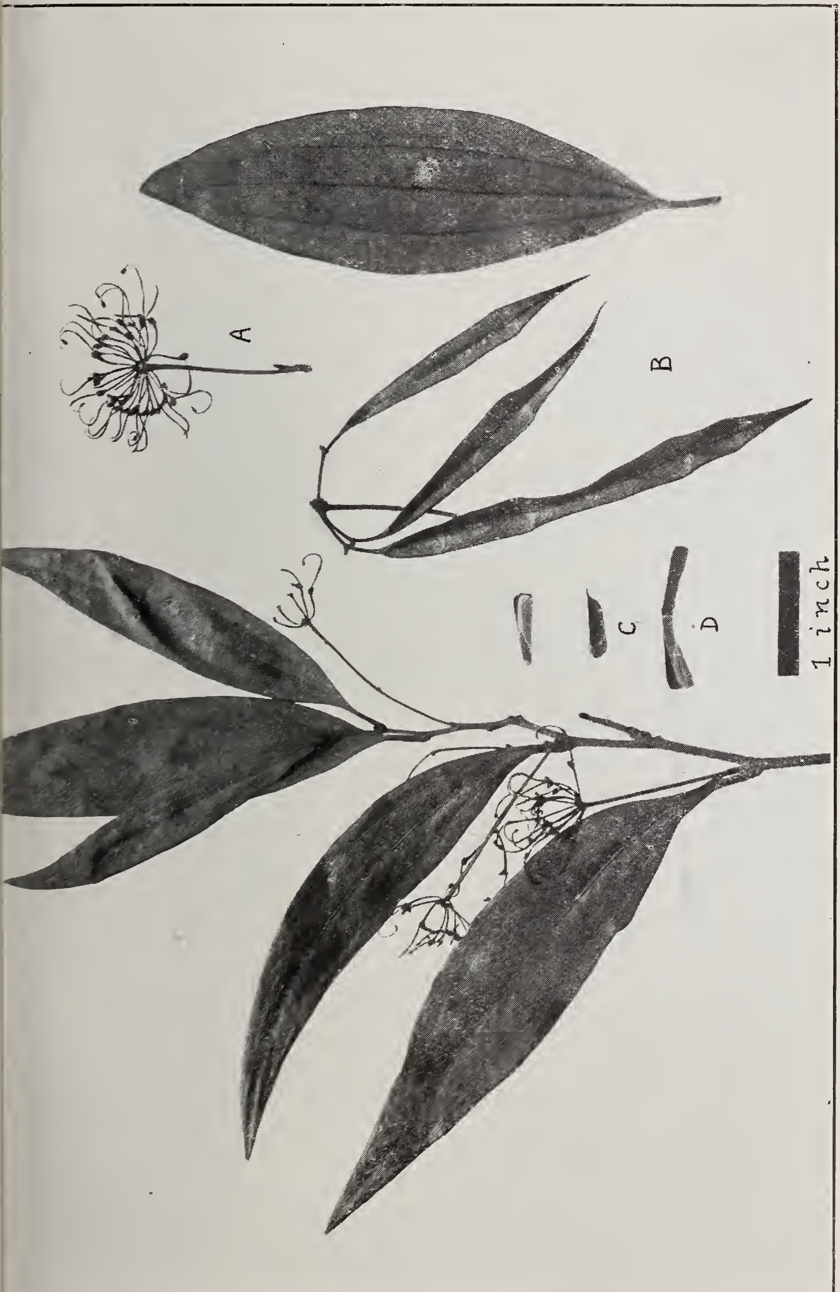


Fig. 54.—Scrub Beefwood (*Stenocarpus salignus*). A, inflorescence; B, empty seed vessels (follicles); C, seeds; D, showing a seed inserted between two lamellae. (*Photo.: Dept. Agric. and Stock, Brisbane.*)

Family HIMANTANDRACEAE.

Himantandra baccata L. Diels. A tree attaining 80 ft. in height and 1 ft. 3 in. stem diameter. Young branchlets and outer part of flowers covered with copper-coloured scales. Leaves alternate, simple, underside with scattered copper-coloured scales. The leaves closely resemble the leaflets of *Tarrietia Argyrodendron* (see Fig. 175), and the young branchlets, on account of their coppery scales, are very similar to those of the *Tarrietia*. Leaves 2¾–4½ in. long, 3 times as long as broad. Fruit red, globular, ¾–1 in. diameter, containing 3 or more flattened seeds. *Galbulimima baccata* F. M. Bailey is a synonym. On Atherton Tableland the species attains 100 ft. in height and 3 ft. stem diameter; the stem is flanged at the base; bark yellowish brown, sparsely marked by small pustules and often having slight depressions which are curved and sometimes arranged in a concentric manner (these depressions are sometimes seen on Southern specimens); bark when cut brownish yellow, outer layer green, smell resinous; thickness of bark ⅜ in. on tree 18 in. stem diameter. Wood pale or white.—Eumundi to Atherton.

Family ANONACEAE.

Polyalthia nitidissima Benth. A tree attaining 60 ft. in height. Branchlets brown and marked by small raised dots (lenticels). Leaves alternate; stalks ⅛ in. long; blades egg-shaped or elliptical in outline, 3–4½ in. long, 2–3 times as long as broad, upper surface glossy; midrib, lateral nerves, and net-veins visible on both sides. Flowers on stalks ½–¾ in. long arising from the axils of the leaves. The fruit consists of 3–8 egg-shaped carpels about ⅜ in. long, each carpel on a stalklet ⅙–¼ in. long. The carpels each contain a single seed. The several (3–8) carpels on the original flower-stalk develop from one flower. This arrangement of several stalked carpels arising from one flower is very infrequent outside the family Anonaceae.—Northern N. S. Wales (Moore); Gympie to Cape York Peninsula; New Caledonia (Benth.).

Family MONIMIACEAE.

Fruit consisting of several egg-shaped, somewhat succulent carpels seated on a disk	1. *Wilkiea.*
Fruit dry and often splitting open, consisting of several slender, hairy carpels enclosed in the enlarged perianth.	
Anthers not produced into long points.	
Leaves generally toothed and mostly green on underside ..	2. *Daphnandra.*
Leaves toothed or entire, mostly white or grey on underside	3. *Atherosperma.*
Anthers produced into points almost as long as the perianth segments.	
Leaves mostly toothed	4. *Doryphora.*

1. WILKIEA.

Wilkiea Huegeliana A.DC. (*Mollinedia Huegeliana* Tul.). Shrub or tree up to 25 ft. high. Bark grey. Branchlets smooth and round. Leaves opposite; stalks ¼–⅜ in.; blades sometimes rigid, lance-shaped or narrowly elliptical, margins with rigid teeth or sometimes entire, venation raised and very prominent on underside, apex blunt or sharply pointed, 2–5 in. long, 3–4 times as long as broad. Male and female flowers often on different trees. Flowers cup-shaped or globose with a small terminal orifice, arranged in racemes or raceme-like panicles in the forks of the leaves or at ends of branchlets. The fruit consists of several black, stalkless carpels seated on a tubercular disk measuring up to ½ in. diameter; each disk is borne on a stalklet ⅜–⅝ in. long; each carpel is egg-shaped, ½–⅔ in. long, and contains a single seed. Wood pale, fairly soft, and contains prominent rays.—Kiama (Benth.) to Bellenden-Ker Range, south of Cairns.

2. DAPHNANDRA.

Daphnandra micrantha Benth. Socket Wood (the branches when broken at the joints often show a ball-and-socket-like fracture), Canary Sassafras. Figs. 55 and 56.

Derivation.—Greek *daphne*, the laurel or bay tree; *aner, andros*, a man (probably alluding to the anthers being like those of a daphne); micrantha from Greek *mikros* small, *anthos* a flower.

Description.—A large tree, attaining a height of about 120 ft. and a stem diameter of over 2 ft. Stem sometimes slightly flanged at the base. Bark grey, often rough with small pustules; when cut, yellow with a thin brown outermost layer; thickness of bark, ½ in. on a tree with a stem diameter of 2 ft. 3 in. Sapwood light yellow. Older leaves and branchlets hairless, young shoots often downy. Leaf-stalks $\frac{1}{8}$–$\frac{1}{4}$ in. long. Leaves opposite, elliptical, rather narrowed at the base, protracted into a fairly long point at the apex, margins coarsely toothed, lateral nerves and net-veins more conspicuous on the underside ; measurement of leaf-blade, 2–4 in. long, $2\frac{2}{3}$–4 times as long as broad. Flowers in small inflorescences (panicles) in the forks of the leaves or at the scars of fallen leaves, the inflorescences much shorter than the leaves. Stalks of individual flowers short. Individual flowers measuring about $\frac{3}{10}$ in. in diameter when expanded. The outer part of the flower consists of 10–15 (11–12 in the specimens examined) perianth segments $\frac{1}{12}$–$\frac{1}{8}$ in. long, the outer ones shorter than the inner ones. On the inner side of the perianth segments, and shorter than them, are 5 stamens. On the inner side of the stamens are 6 or more minute hairy staminodia (modified stamens) surrounding several finely hairy bristle-like carpels (female organs). Fruit consisting of the lower part of the perianth enclosing the mature carpels, narrowly egg-shaped or almost cylindrical, often oblique, $\frac{1}{2}$–1 in. long ; carpels very slender, covered with fine brown hairs attaining $\frac{1}{4}$ in. in length. Flowering period : October ; in fruit in January.

Distribution.—Common in the scrubs of the Killarney Ranges, National Park, Macpherson Range, Tambourine Mountain. It was also common in the scrubs about Brisbane. Amamoor and Imbil, in the Gympie district, are the northernmost records. As far south as the Hunter River, N.S.W. (J. H. Maiden).

Uses.—The timber could be used for general indoor and cabinet work.

References.—*Daphnandra micrantha,* Bentham, Flora Australiensis, vol. v., p. 285, 1870.

3. ATHEROSPERMA.

Atherosperma moschatum Labill. Tree attaining 100 ft. in height (J. H. Maiden). Bark, branchlets, and leaves when broken have a strong sassafras-like odour. Leaves opposite ; leaf-blades white on underside, margins sharply toothed or entire, similar in shape to those of *Doryphora sassafras* but sharper at apex. Flowers structurally similar to those of *Doryphora sassafras* but with 8–10 perianth lobes, more numerous stamens, and without the long points above the anthers and the staminodia in male flowers. The carpels of the fruit are also similar to those of *Doryphora sassafras,* but the hairs covering them are shorter and the style is terminal and not apparently basal or lateral by the lateral development of the carpels as in *Doryphora.*—N. S. Wales, Victoria, Tasmania.

4. DORYPHORA.

Doryphora sassafras Endl. Yellow Sassafras, Sassafras, New South Wales Sassafras, Golden Deal, Canary Sassafras. Figs. 57 and 58.

Derivation.—Greek *dory* a spear, *phoreo* I carry (alluding, perhaps, to the bristle-like points of the anthers) ; Sassafras is the name of a well-known North American tree with a similar fragrance.

Description.—A large tree attaining a height of 120 ft. and a stem diameter of 4 ft. Stem not prominently buttressed. Bark grey, sometimes slightly wrinkled and finely scaly ; when cut it is brown and measures $\frac{7}{16}$ in. thick on a tree with a stem diameter of 2 ft. 4 in. ; sapwood pale. Heartwood deep yellow. The bark and sapwood are fragrant, but the sassafras odour of Queensland specimens is not so strong as in *Cinnamomum Oliveri.* Young shoots and flowers downy with silky hairs ; adult leaves and branchlets hairless. Leaf-stalks $\frac{1}{8}$–$\frac{1}{4}$ in. long. Leaves opposite, elliptical, narrowed at the base, the apex with a blunt point, margins coarsely toothed, lateral nerves and net-veins more conspicuous on the underside ; measurement of leaf-blade $1\frac{3}{4}$–$3\frac{1}{2}$ in. long, $2\frac{1}{2}$–$3\frac{1}{4}$ times as long as broad. Flowers in small inflorescences in the forks of the leaves. In each flower-bearing fork there are 1 or 2 stalks (peduncles), measuring from $\frac{1}{6}$ to over $\frac{1}{4}$ in. long ; at the apex of each stalk there are generally 3 silky-downy flowers each on a stalklet about $\frac{1}{4}$ in. long. Individual flowers about 1 in. in diameter when expanded. The outer part of the flower consists of 6 perianth lobes tapering into fine points. On the inner side of the perianth lobes and opposite to them are 6 stamens nearly as long as the perianth lobes ; the anthers or pollen-containing organs of the stamens are situated towards the base of the stamens and are surmounted by long bristle-like points ; alternating with the stamens are 6 shorter and narrower staminodia. The carpels, the female organs of the flower, of which there are several, are situated within the lower part of the perianth. In the fruit the lower part of the perianth is enlarged, becoming narrowly egg-shaped and measuring over $\frac{1}{2}$ in. in length ; it eventually splits on one side and exposes the carpels, which are covered with long brown hairs attaining $\frac{1}{2}$ in. in length. Flowering period : July ; in fruit, November and December.

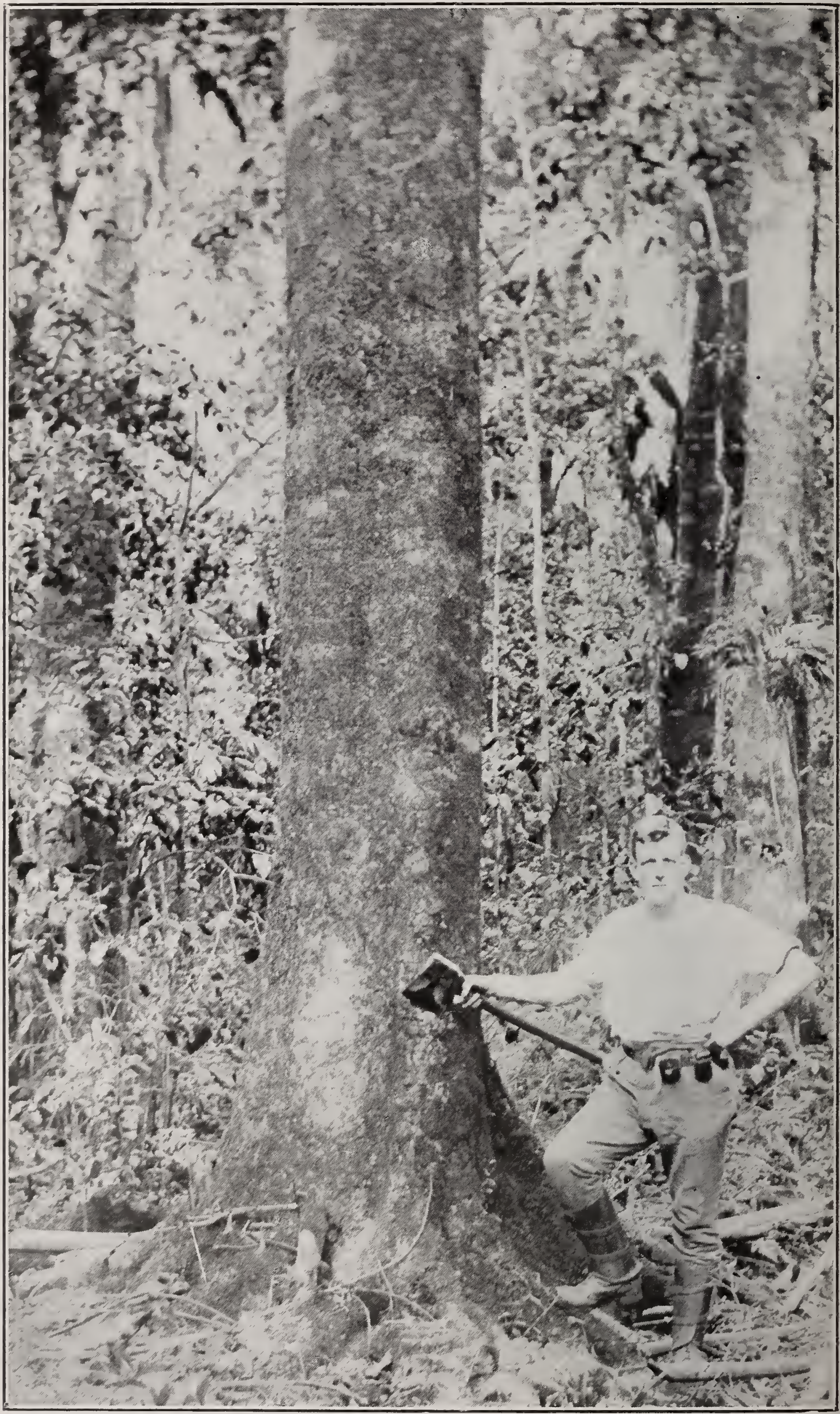


Fig. 55.—Socketwood (*Daphnandra micrantha*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

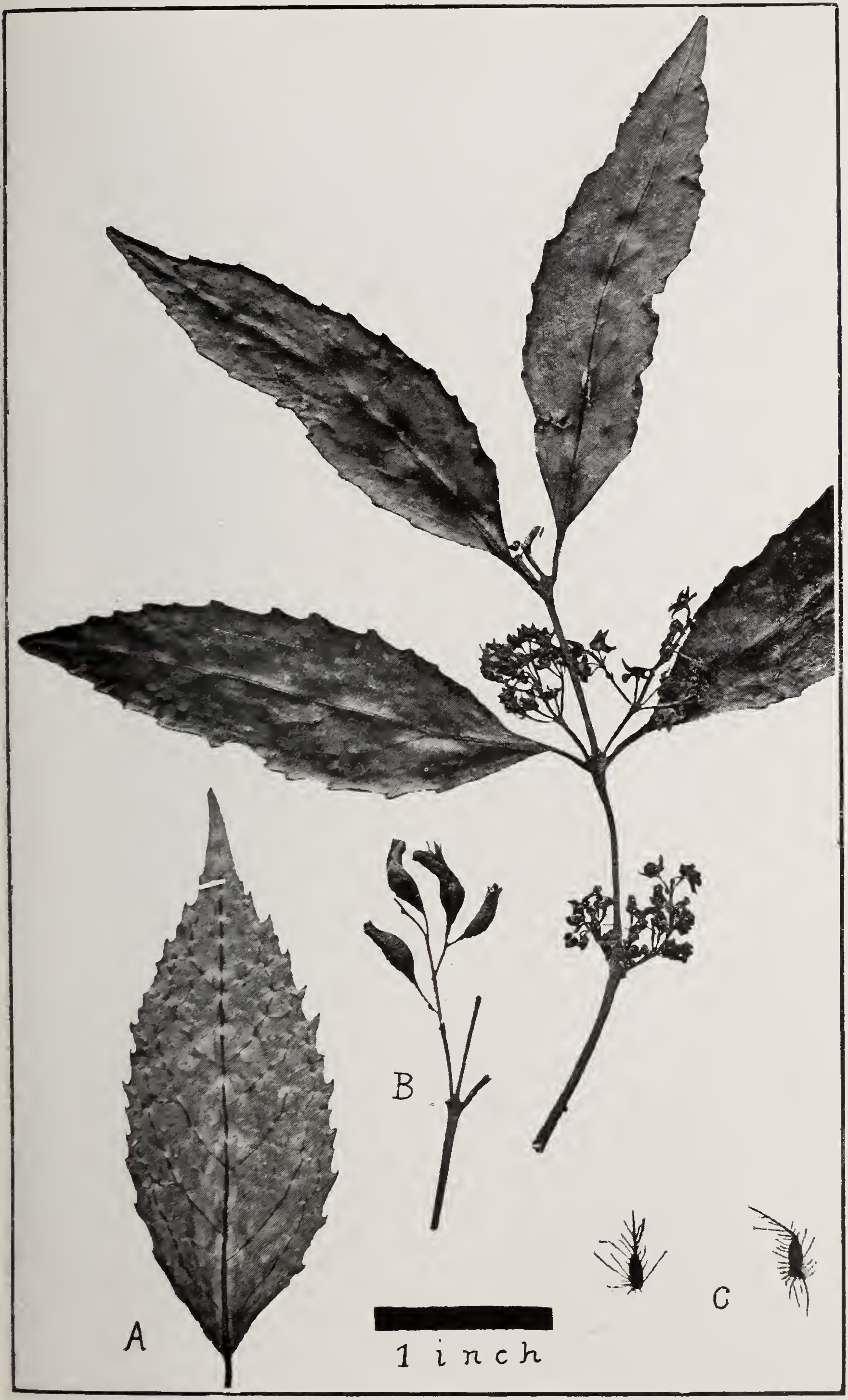


Fig. 56.—SOCKETWOOD (*Daphnandra micrantha*). Branchlet with inflorescences. A, leaf, showing underside; B, fruits; C, carpels. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

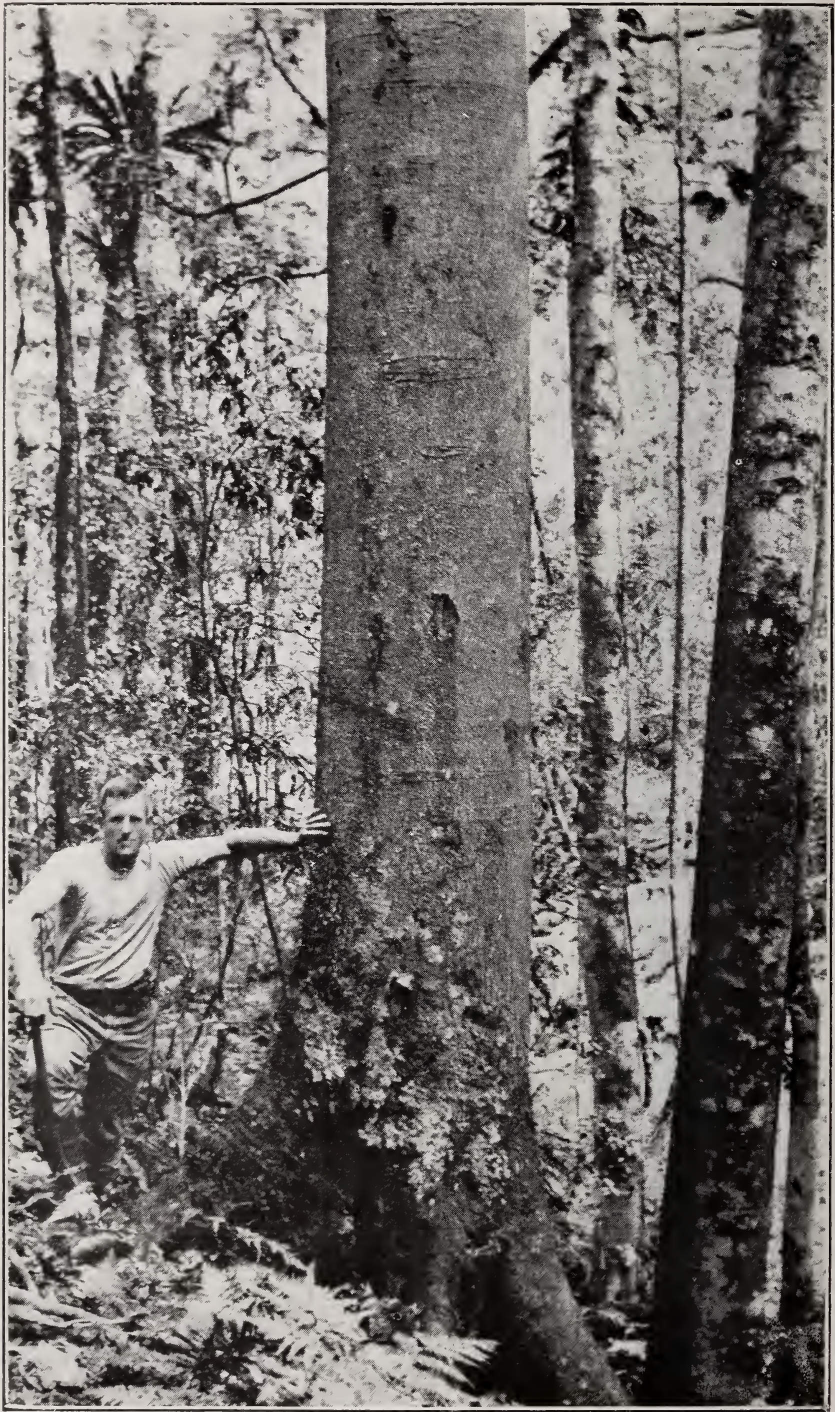


Fig. 57.—Yellow Sassafras (*Doryphora sassafras*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

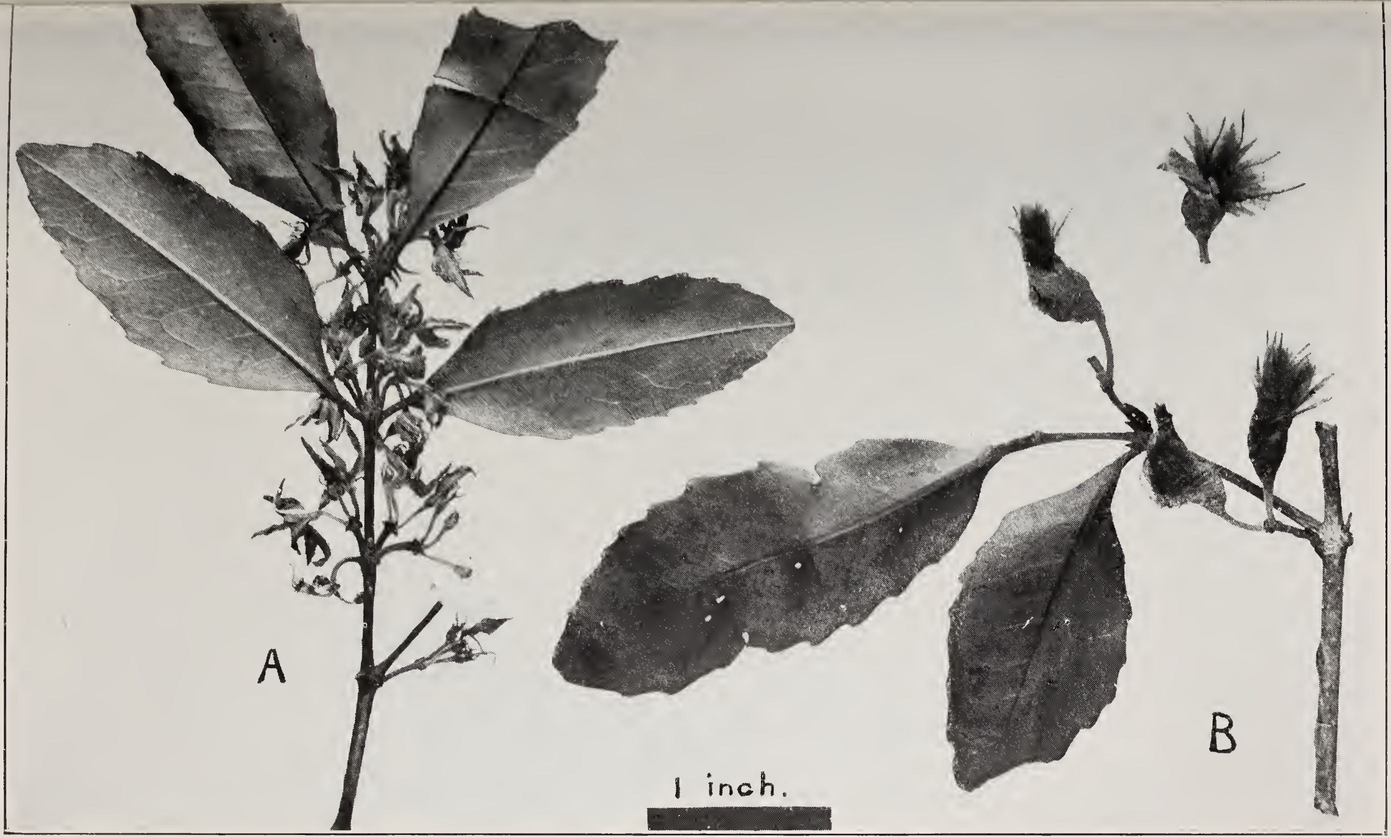


Fig. 58.—YELLOW SASSAFRAS (*Doryphora sassafras*). A, flower-bearing branchlet; B, fruit-bearing branchlet. All in dry state.
(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Distribution.—A very common tree in the scrubs of the ranges near Killarney, Macpherson Range, National Park, and Upper Nerang River. There are no records of it north of Brisbane. It is found in New South Wales in scrubs or brush, from near the Victorian border on the south to the Queensland border on the north (J. H. Maiden).

Uses.—The timber appears to be used fairly extensively in the Warwick district for general indoor purposes, such as lining, flooring, &c. It is often known there as "Golden Deal." In New South Wales it is also used for lining, flooring, &c. According to Mr. J. H. Maiden, it is rarely touched by white ants, but takes a long time to dry and will not stand gluing.

Chemical.—Dr. J. M. Petrie, Linnean Macleay Fellow in Biochemistry, found that the bark, leaves, and fruit contain an essential oil of a characteristic sassafras odour. The bark contained 1·35 per cent., leaves 4·3 per cent., and fruit 4 per cent. (percentage calculated on material dried at 100 deg.). He also found in the bark, leaves, and fruit a poisonous alkaloid which he named "Doryphorine." (Proc. Linn. Soc. N.S.W. 37, 139).

References.—*Doryphora sassafras* Endlicher, Iconographia Generum Plantarum, tablet 10, 1838.

Family LAURACEAE.

Leaves opposite or mostly opposite. Bark often pustular and with sassafras odour	1. *Cinnamomum.*
Leaves alternate or approximated in groups of 3–5. Flowers in groups, each group enclosed in 4-6 concave bracts ..	2. *Litsea.*
Leaves alternate.	
Ovary not immersed in perianth tube. Perianth at base of young fruit.	
Stamens of outer series (opposite perianth lobes) 6	3. *Beilschmiedia.*
Stamens of outer series (opposite perianth lobes) absent ..	5. *Endiandra.*
Ovary immersed in perianth tube which encloses the fruit; remains of perianth lobes often evident at summit of fruit	4. *Cryptocarya.*

1. CINNAMOMUM.

Cinnamomum Oliveri F.M.B. Oliver's Sassafras, Sassafras, Camphorwood. Figs. 59 and 60.

Derivation.—Latin Cinnamomum = Greek *kinnamomon,* cinnamon; Oliveri, after D. Oliver.

Description.—A large tree attaining a height of 130 ft. and a stem diameter of 3 ft. Bark brown or dark brown, rough with large pustular processes, especially on the large trees, very fragrant. When cut through the bark is brown in colour and measures $\frac{5}{8}$ in. in thickness on a tree with a stem diameter of 1 ft. 8 in. Wood pale, often with a yellow tint when green, pale brown when seasoned, fragrant even when aged. Leaf-stalks $\frac{1}{4}$–$\frac{1}{2}$ in. long. Leaves opposite, narrowly lanceolate, tapering at the base and apex, upper surface glossy, under surface paler, almost penninerved, the basal pair of primary lateral nerves faint and close to margin of leaf, a few oblique lateral nerves and net-veins visible on both sides, transparent oil-dots minute, visible under a strong lens when the leaf is held up to the light; measurement of leaf-blade 3–7 in. long, 3–4$\frac{1}{2}$ times as long as broad. Inflorescence in panicles at the ends of branchlets or in the forks of leaves near the ends of branchlets. Panicle branches downy with fine whitish hairs. Individual flowers on stalklets $\frac{1}{6}$–$\frac{1}{4}$ in. long, covered with whitish down, each flower over $\frac{1}{4}$ in. long, consisting on the outside of an envelope (perianth) of 6 lobes, each lobe about $\frac{1}{8}$ in. long. Within the envelope are 9 stamens and 3 staminodia, all shorter than the perianth lobes and arranged in 2 series; the outer series consists of 6 stamens, each one opposite to and inserted on the base of each perianth lobe; the inner series consists of 3 stamens (about as long as those of the outer series), and each stamen of the inner series has a pair of minute round glands attached to it near its base; the 3 staminodia are shorter than the 3 inner stamens and are inserted between them. The ovary, which is hairless, is situated in the centre of the flower. Berry oval, about $\frac{1}{2}$ in. long, seated in the cup-like enlarged lower portion of the perianth from which the lobes have fallen. A single seed is contained in the berry. The berry is often "galled," when it assumes an irregular shape and larger size with a coating of a yellowish powdery substance. Flowering period: November.

Distribution.—Dense rain forests of Northern N. S. Wales and Southern Queensland from Port Macquarie on the south (R. T. Baker) to Eungella Range (west of Mackay) on the north.

Uses.—The timber is very suitable for indoor work such as lining and cabinet work. A piece of the timber which was brought to the Botanic Museum in 1886, on being cut at the time of writing, possessed the original sassafras aroma.

Chemical.—G. W. Hargreaves (Journal of Chemical Society 1916, 109, p. 751) found that the oil from the bark (71 kilos produced 1,700 cc. of oil) contained 18–20 per cent. of camphor, 12–15 per cent. pinene, 25–27 per cent. safrole ; and that the oil from the leaves contained 60 per cent. of camphor, 25 per cent. pinene and phellandrene (?), and 15 per cent. phenols and other substances.

Reference.—*Cinnamomum Oliveri* F. M. Bailey in Botany Bulletin No. 5, p. 24, 1892 (Bulletin No. 18, Dept. Agriculture and Stock, Brisbane).

Cinnamomum virens R.T.B. The herbarium specimens of this species are very similar to those of *Cinnamomum Oliveri.* R. T. Baker, who named the species, describes it as a tree about 90 ft. high and 2 ft. in stem diameter. He states that it differs from *Cinnamomum Oliveri* in the uniform colour of the upper and lower surfaces of the leaves and in its non-aromatic bark.—Richmond and Tweed Rivers.

2. LITSEA.

Litsea zeylanica Nees. Small tree. Leaf-stalks $\frac{1}{2}$–1 in. long. Leaves egg-shaped in outline, tapering at both ends, white or pale on underside, basal pair of lateral nerves prominent and joining midrib a little above insertion of stalk, 3–5$\frac{1}{2}$ in. long, 2–3 times as long as broad. Cup-shaped perianth tube at base of fruit not so large as in *Litsea reticulata.* Distinguished from *Litsea dealbata* by the deciduous perianth lobes of the fruit.—Gloucester (Maiden) to Cairns.

Litsea dealbata Nees. Tree about 20 ft. high. Leaves often approximated in groups of 3–5 at ends of branchlets or at nodes, similar in shape and venation to those of *Litsea zeylanica.* The large leaves (up to 7 in. long) with white undersides are conspicuous features. Leaf-stalks $\frac{3}{8}$–$\frac{5}{8}$ in. ; blades 4–7 in. long, 2–3 times as long as broad.—Illawarra (Benth.) to Cairns.

Litsea ferruginea Benth. and Hook. Brown Bolly Gum, Brown Bollywood.

Derivation.—Litsea from *Litse* the Chinese name of *Litsea chinensis* ; ferruginea from Latin *ferrugo,* rust (alluding to the rust-coloured hairs of the branchlets and undersides of the leaves).

Description.—A tree attaining a height of about 50 ft. and a stem diameter of about 1 ft. Stem not prominently buttressed. Bark brown, fairly rough. Young branchlets and underside of the leaves downy or often velvety with brown hairs. Leaf-stalks $\frac{3}{8}$–$\frac{5}{8}$ in. long. Leaves alternate, elliptical, sometimes drawn out into a short point at the apex, upper surface smooth, underside downy or velvety in the normal form ; midrib, lateral nerves, and net-veins very conspicuous and raised on the underside, less conspicuous on the upper surface ; measurement of leaf-blade 3$\frac{1}{2}$–5$\frac{1}{2}$ in. (up to 8 in. in luxuriant specimens) long, 2–3 times as long as broad. Male and female flowers on different trees, so far as known ; inflorescences in clusters of 2–8 in the forks of the leaves or at the scars of fallen leaves. Each of the stalks in a cluster measures from $\frac{1}{8}$–$\frac{1}{2}$ in. long and bears at its summit 4 or 5 round or oval concave bracts measuring about $\frac{1}{6}$ in. in diameter. Surrounded by the bracts are 4–6 flowers from $\frac{1}{8}$–$\frac{1}{6}$ in. long. The outer part of the flower, the perianth, is almost bell-shaped, is downy, and divided to the middle into 6 lobes ; it encloses in the male flowers 9 stamens, about as long as the perianth, arranged in 2 series, the 3 stamens of the outer series without glands on their filaments, the 6 of the inner series with 2 glands attached to the lower part of the filament of each. In the female flowers the perianth encloses 12 staminodia (rudimentary stamens) nearly as long as the perianth, 6 in an outer series without glands and 6 in an inner series with glands as in the male flowers. The stamens and the staminodia are minutely hairy. The ovary, which is situated in the centre of the female flowers. is hairless, egg-shaped at the base, and tapers into a style. Fruit black when ripe, oval, nearly $\frac{3}{4}$ in. long, enclosed at the base in a cup-shaped receptacle, and containing a single seed. Flowering period : February and March.

Distribution.—Common in the scrubs of Eastern Australia from the Bellinger River, N.S.W. (J. H. Maiden), to the Endeavour River, North Queensland.

Uses.—The timber should be useful for indoor work.

References.—*Litsea ferruginea* Bentham and Hooker, Genera Plantarum, vol. 3, 161, 1883 ; *Litsea Hexanthus* A. L. de Jussieu in Annal. du Mus. vi., 212, 1805.

Litsea ferruginea Benth. and Hook., var. **lanceolata** Meissn. This variety is described as having longer leaves than the normal form. It is recorded by Bentham from the Brisbane River and North Queensland.

Litsea reticulata Benth. Bolly Gum, Brown Beech, Bolly Beech, Brown Bolly Beech, Brown Bollywood. Figs. 61 and 62.

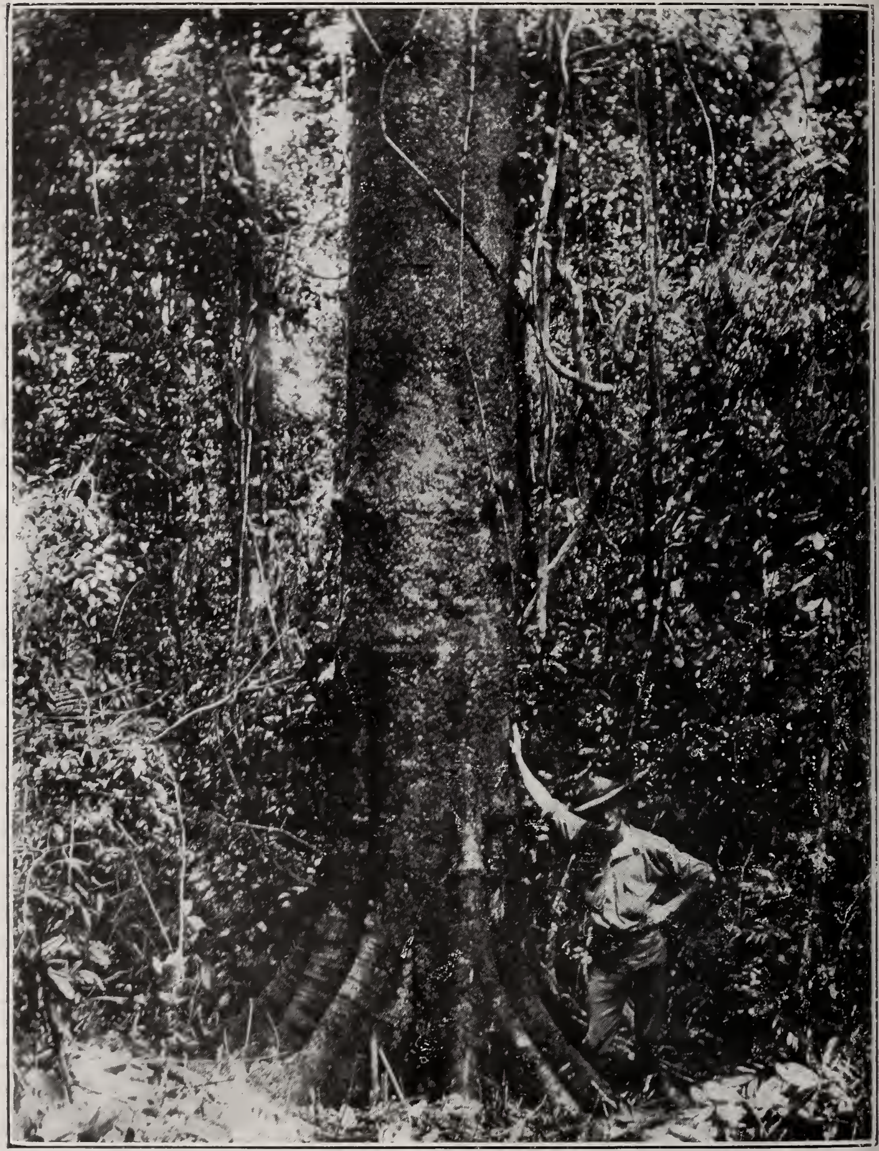


Fig. 59.—Oliver's Sassafras (*Cinnamomum Oliveri*). Traveston, south of Gympie, about 26.3° S.

(*Photo.: W. D. F.*)

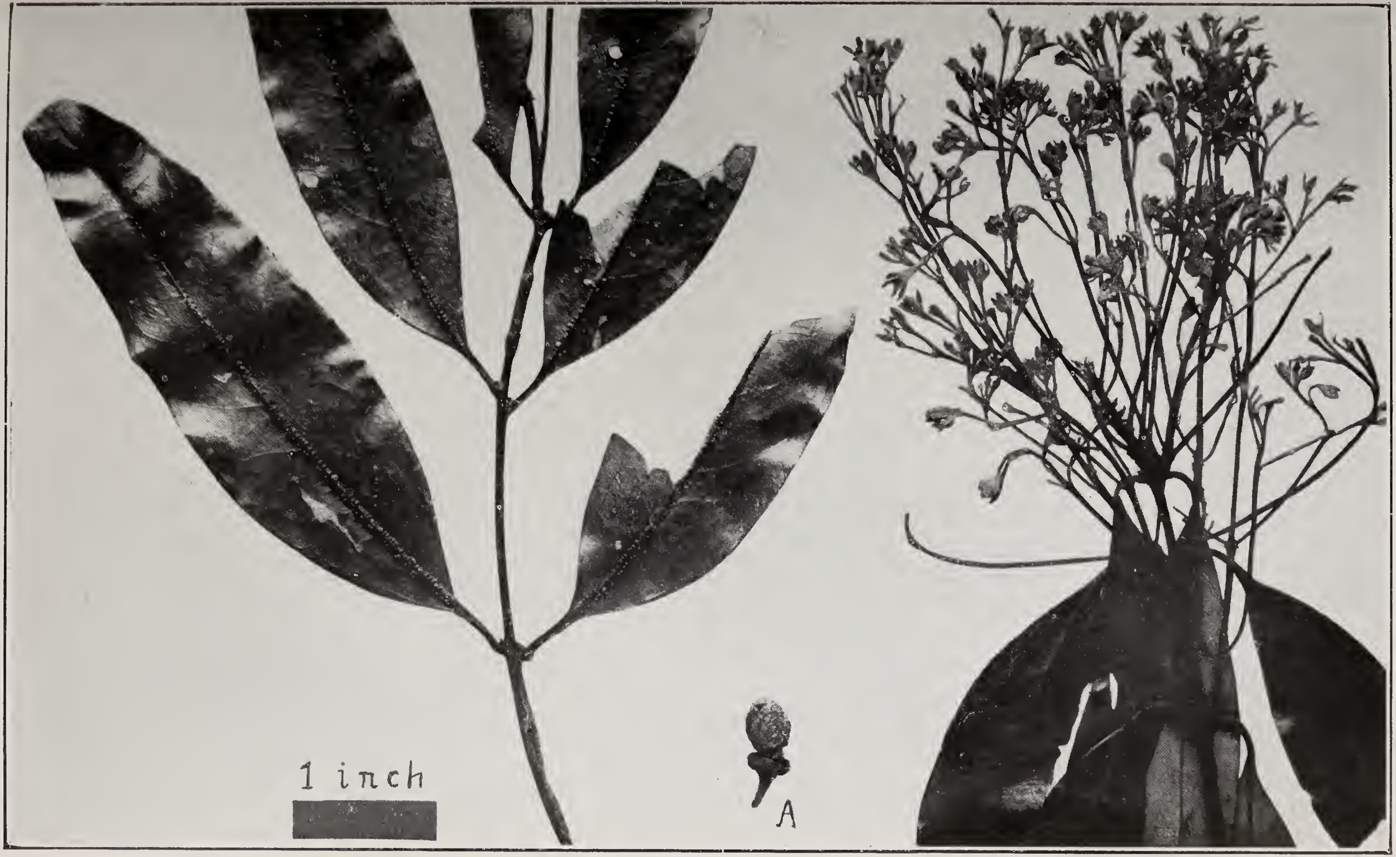


Fig. 60.—Oliver's Sassafras (*Cinnamomum Oliveri*). A, dry fruit, partly released from the enlarged perianth tube at base. Flower-bearing branchlet on right. All in dry state. (*Photo.: Dept. Agric. and Stock, Brisbane.*)

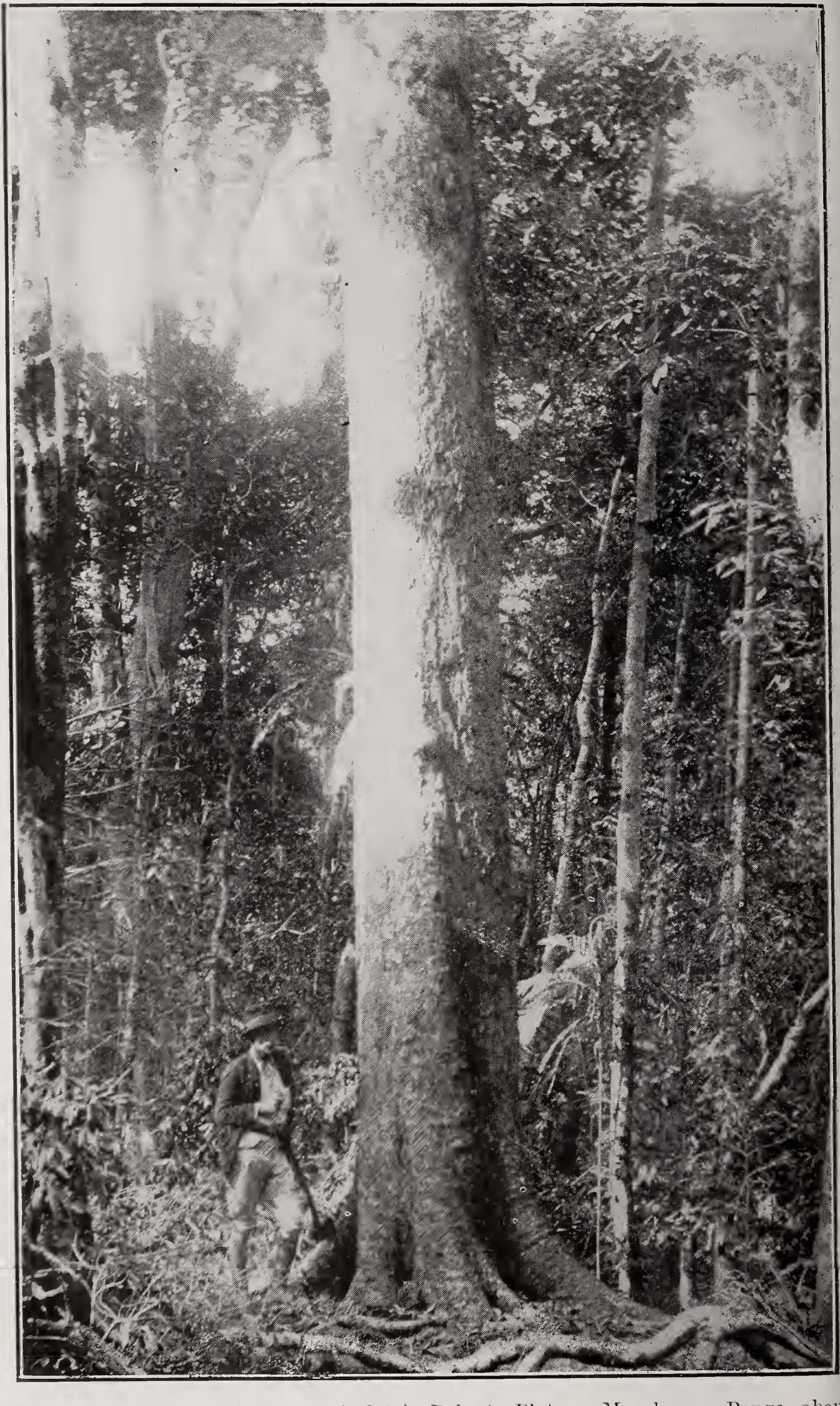


Fig. 61.—Bolly Gum (*Litsea reticulata*). Roberts Plateau, Macpherson Range, about 28.3° S. Walking-stick Palm (*Bacularia monostachya*) on right of tree.
(*Photo.: W. D. F.*)

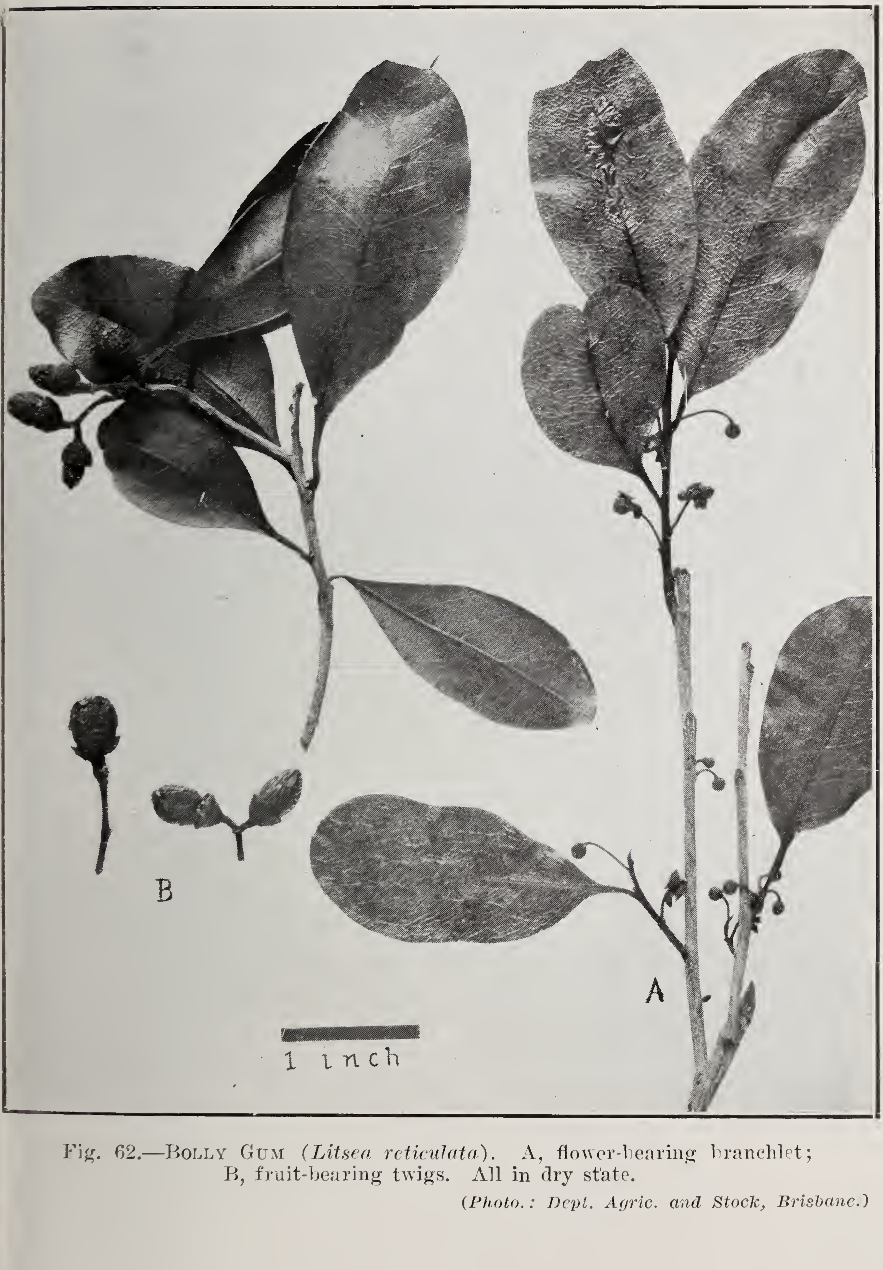


Fig. 62.—Bolly Gum (*Litsea reticulata*). A, flower-bearing branchlet; B, fruit-bearing twigs. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

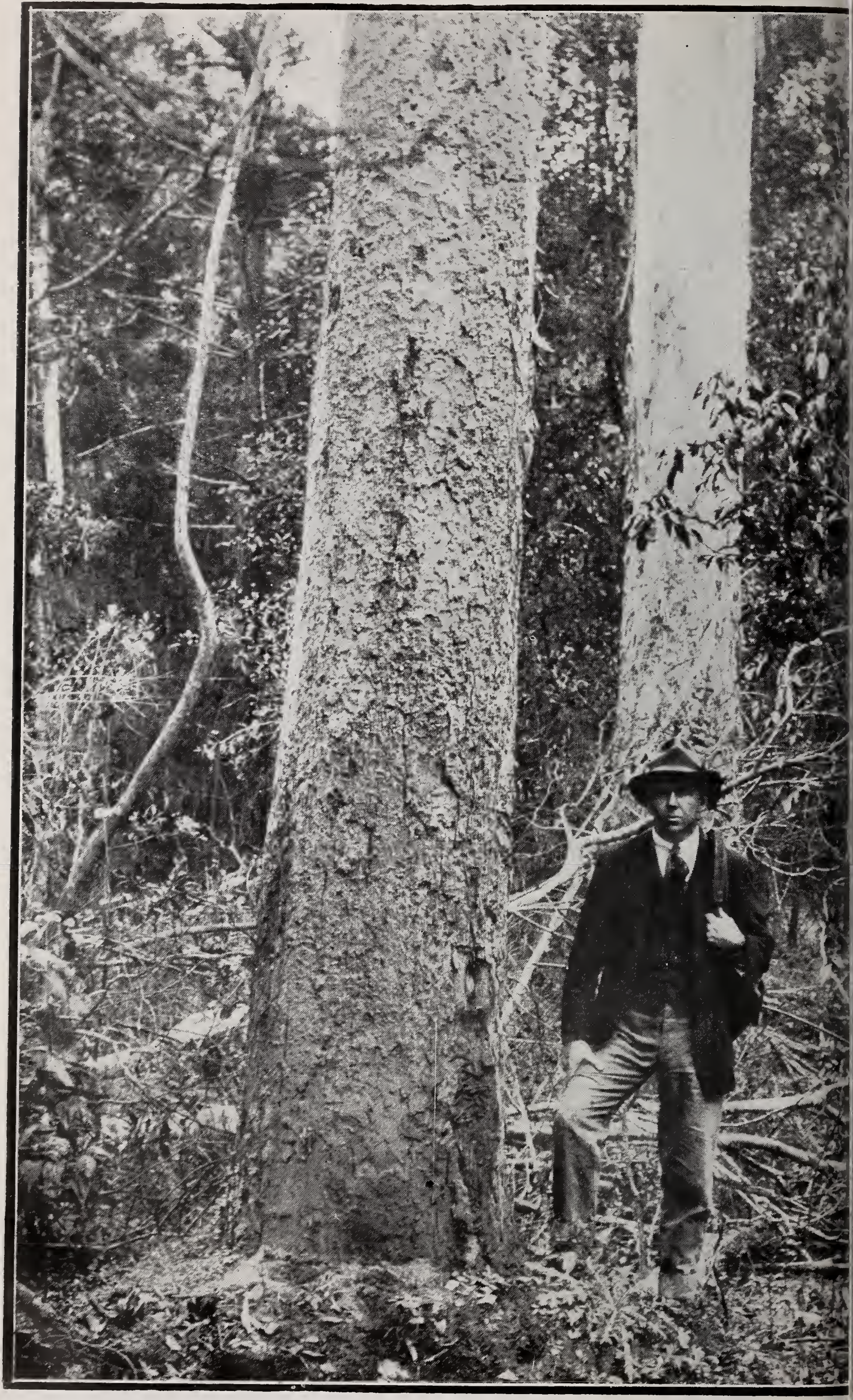


Fig. 63.—Hard Bolly Gum (*Beilschmiedia obtusifolia*). Goodna, near Brisbane, about 27.5°
(*Photo.: W. D. F.*)

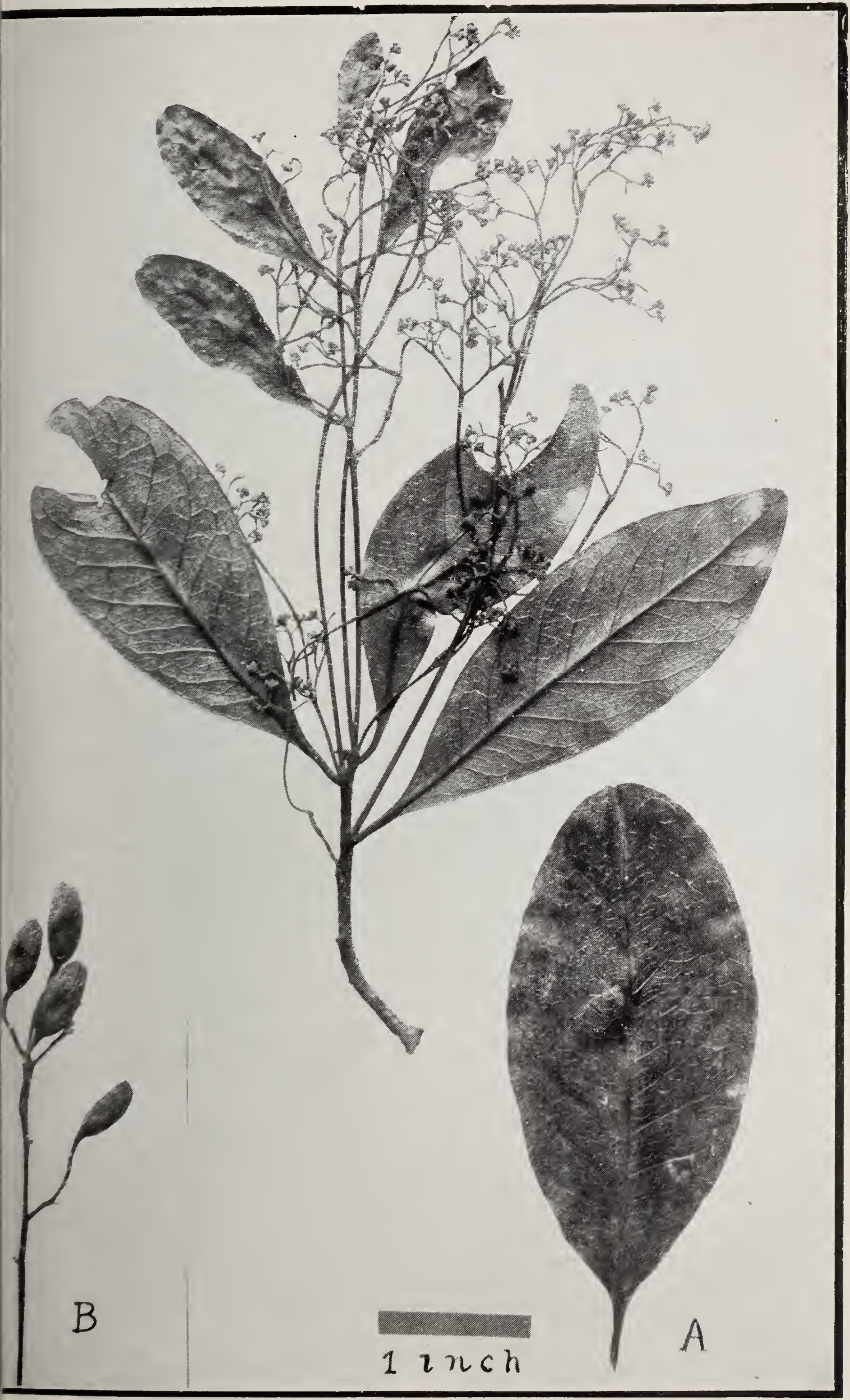


Fig. 64.—HARD BOLLY GUM (*Beilschmiedia obtusifolia*). Flower-bearing branchlet. A, broad leaf; B, twig bearing dry fruit. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

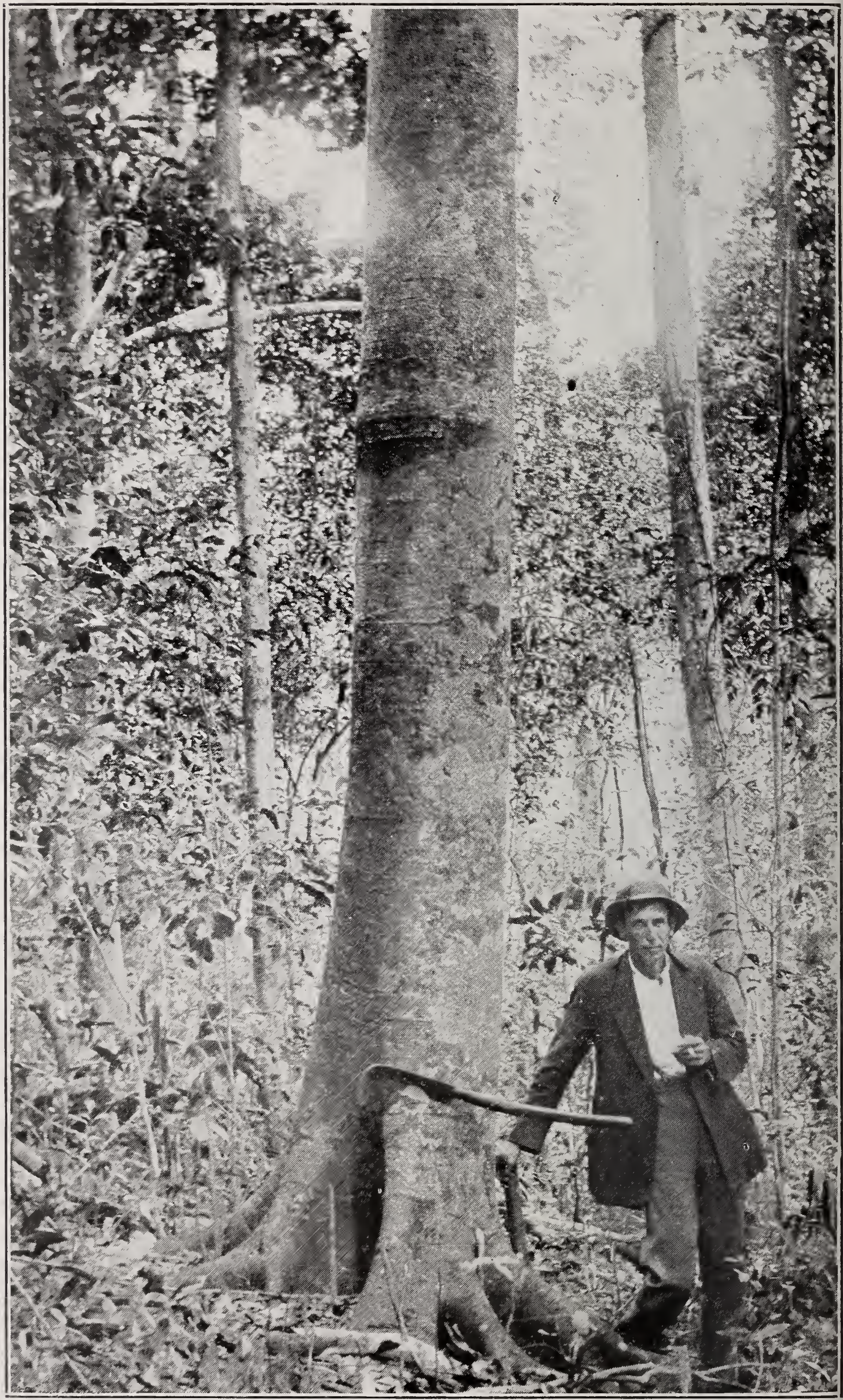


Fig. 65.—Beilschmiedia elliptica. Kin Kin, about 26.2° S.

(*Photo.: W. D. F.*)

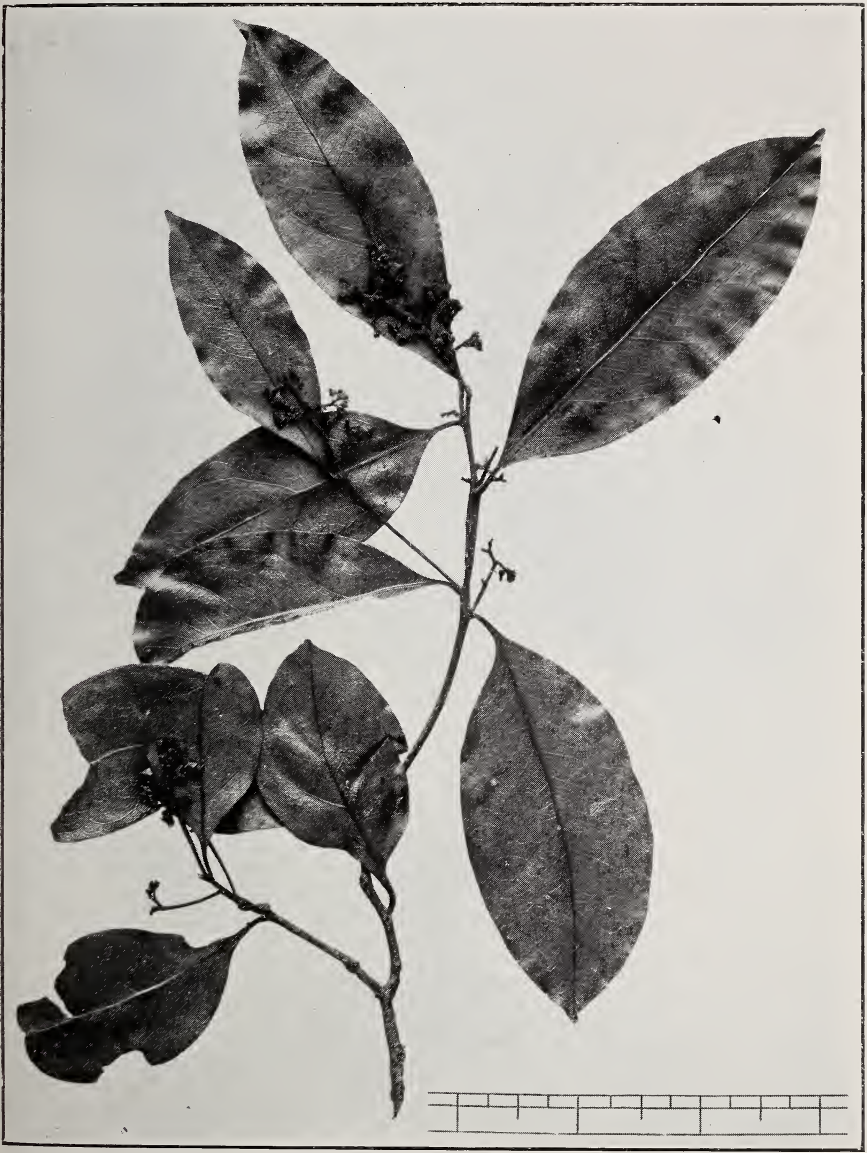


Fig. 66.—Beilschmiedia elliptica. Dry flower-bearing specimen. The three larger visions of the scale represents inches. From Botany Bulletin No. 22 by C. T. White and . D. Francis.

(Photo.: Dept. Agric. and Stock, Brisbane.)

Derivation.—Litsea from *Litse*, the Chinese name of *Litsea chinensis*; reticulata from Latin *reticulum*, a small net (alluding to the numerous net-veins of the leaves).

Description.—A large tree attaining 120 ft. in height and a stem diameter of 5 ft. Stem often flanged at the base in very large trees. Bark brown or sometimes grey, generally shed in roundish flakes which give it a scaly appearance, often marked by small pustules; when cut pale or light brown, measuring ⅞ in. thick on a tree with a stem diameter of 3½ ft. Sapwood yellowish white. Leaf-stalks ¼–½ in. long. Leaves alternate, oval or narrowly oval in outline, blunt or rounded at the apex; midrib, lateral nerves, and net-veins visible on both sides; measurement of leaf-blade 1½–3½ in. long in Southern specimens, sometimes 5 in. long in North Queensland specimens, 2–3 times as long as broad. Male and female flowers on separate trees. Flowers arranged in small raceme-like inflorescences in the forks (axils) of the leaves or at the scars of fallen leaves, the inflorescences seldom exceeding 1 in. long and generally much shorter. Each of the stalks in an inflorescence varies in length from ¼–¾ in., the stalks of the females being shorter than those of the males. Sometimes the inflorescences are reduced to single stalks. At the apex of each stalk are 4 concave bracts about ⅕ in. long which surround a cluster of about 6 silky flowers, each flower measuring ⅛–¼ in. long. The outer part of the flowers consists of 6 perianth segments. In male flowers the perianth segments enclose 9 stamens (6 in outer series and 3 in inner series) with hairy filaments; each of the filaments of the 3 inner stamens has a pair of glands near its base. In female flowers the perianth encloses 9 staminodia which are shorter than the perianth and which surround a hairless ovary. Fruit black when ripe, oval, about ½ in. long, enclosed at the base in a large cup-shaped receptacle (enlarged perianth tube) which is about one-third the length of the fruit. Fruit containing a large single seed. Flowering period: April and May.

Distribution.—Common in the coastal scrubs from Hawkesbury River, N.S.W. (J. H. Maiden), to Cairns, North Queensland.

Uses.—The timber is light in weight, pale brown in colour, and often attractively figured. It is used for staves, cabinet work, lining, flooring, and indoor fittings. The pores of the wood are single and in groups or radial rows of 2–4 in each row; soft tissue inconspicuous.

Reference.—*Litsea reticulata* Bentham in Bentham and Hooker's Genera Plantarum, vol. 3, p. 161, 1883.

3. BEILSCHMIEDIA.

Beilschmiedia obtusifolia Benth. Hard Bolly Gum, Blush Walnut. Figs. 63 and 64.

Derivation.—After O. S. Beilschmied; obtusifolia from Latin *obtusus* obtuse, *folium* a leaf (alluding to blunt apex of the leaf).

Description.—A large tree attaining about 150 ft. in height and a stem diameter of 3 ft. Stem sometimes flanged at the base. Bark grey or brown, scaly; when cut it is seen to be reddish brown internally and measures ½ in. thick on a tree with a stem diameter of 3 ft. Sapwood white. Leaf-stalks ⅙–⅓ in. long. Leaves alternate, elliptical in outline, narrowed towards the stalk, rounded or obtuse or rarely shortly and bluntly pointed at the apex, lateral nerves and net-veins prominent, especially on the underside: measurement of leaf-blade 2–4 in. long, about 2½ times as long as broad. Flowers in inflorescences (panicles) at the ends of branchlets or in the axils (forks) of the upper leaves, the panicles often as long as or longer than the leaves. Individual flowers on stalklets; the fresh flowers are over ⅛ in. in diameter when fully out and consist of 6 minutely hairy perianth lobes about $\frac{1}{12}$ in. long, which are joined in a short tube at the base and fall away together. On the inner side of the perianth lobes are 9 stamens all less than $\frac{1}{10}$ in. long arranged in 2 series; stamens of the outer series 6, each stamen borne on the base of each perianth lobe; stamens of the inner series 3, each stamen with 2 glands at its base and 1 barren stamen (staminode) between each 2 fertile stamens. The ovary is in the centre of the flower, is minute, egg-shaped, tipped by a point (the style) at the apex and is hairless; it is free and not united with the perianth tube. Fruit oval, about ¾ in. in length, black outside with a green fleshy pulp covering a single large seed. Flowering period: May.

Distribution.—Coastal scrubs from the Clarence River, N.S.W. (Bentham), to the Daintree River, north of Cairns, Queensland.

Uses.—The timber should be useful for indoor work.

Remarks.—The fresh flowers have an offensive odour.

References.—*Beilschmiedia obtusifolia* Bentham in Bentham and Hooker's Genera Plantarum, vol. iii., p. 152, 1883; *Nesodaphne obtusifolia* Bentham, Flora Australiensis, vol. 5, p. 299, 1870.

Beilschmiedia elliptica W. & F. Grey Walnut. Figs. 65 and 66.

Derivation.—Beilschmiedia, after O. S. Beilschmied; Latin *ellipticus*, shaped like an ellipse (in allusion to the outline of the leaf).

Description.—A tree attaining 100 ft. in height and a stem diameter of 1 ft. 6 in. Stem not prominently buttressed. Bark brown, slightly rough with small scattered pustules, $\frac{1}{4}$–$\frac{1}{3}$ in. thick on a tree with a stem diameter of 1 ft. Very young shoots, branches of the inflorescence, and outside of flowers clothed with minute, scattered, brownish hairs. Branchlets slender and cylindrical. Leaves alternate. Leaf-stalks $\frac{1}{6}$–$\frac{1}{4}$ in. long. Leaf-blades elliptical in outline, narrowed at both extremities and drawn out into a blunt point at the apex, upper surface glossy; midrib, lateral nerves, and net-veins visible on both surfaces but raised and more conspicuous on the under surface; measurement of leaf-blade, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, 2–3 times as long as broad. Flowers in inflorescences (panicles) springing from the forks of the leaves, the panicles shorter than the leaves. Stalklets of individual flowers $\frac{1}{24}$–$\frac{1}{12}$ in. long. Individual flowers broadly bell-shaped, over $\frac{1}{12}$ in. long. The outermost and largest part of the flower, the perianth, is divided almost to the base into 6 lobes; each lobe is egg-shaped in outline and measures $\frac{1}{12}$ in. long. On the inner side each perianth lobe bears a stamen which is slightly shorter than the perianth lobe; each stamen consists of a thick egg-shaped or lance-shaped anther about $\frac{1}{24}$ in. long (with 2 circular pores opening inwards) borne on a short, thick, finely hairy stalklet (filament) bearing a raised line on its inner face. On the inner side of the first series of stamens is a second series of 3 stamens, each stamen about $\frac{1}{18}$ in. long consisting of a fleshy lance-shaped anther with lateral pores and borne on a thick, finely hairy stalklet which bears two minute glands at the base on the outer side; alternating with the 3 inner stamens are 3 staminodia which are about $\frac{1}{40}$ in. long, are broadly heart-shaped, and are borne on exceedingly short, broad, hairy stalklets. Ovary in the centre of the flower, egg-shaped, hairlesss, about $\frac{1}{24}$ in. long and tapering at the apex into a distinct slender style shorter than the ovary itself. The style bears at its summit a shortly thickened stigma. Fruit (possibly immature) globose, about $\frac{1}{3}$ in. in diameter.

Distribution.—Confined to Queensland. Fraser Id. on the north to Kin Kin, east of Gympie, on the south. When the species is better known its range may be extended.

Reference.—*Beilschmiedia elliptica* C. T. White and W. D. Francis, Botany Bulletin No. 22, p. 29, 1920 (Dept. Agriculture and Stock, Brisbane).

4. CRYPTOCARYA.

Cryptocarya patentinervis F.v.M. A Brown Beech. Figs. 67 and 68.

Derivation.—Cryptocarya from Greek *kryptos* concealed, *karyon* a nut (referring to the perianth enclosing the seed); patentinervis from Latin *patens* spreading, *nervus* a vein (alluding to the spreading nerves of the leaves).

Description.—A tree attaining a height of 100 ft. and a stem diameter of 2 ft. Stem not prominently buttressed but the basal part merging into large, thick, flanged roots. Bark very light grey or almost white in colour, marked by numerous round corky pustules about $\frac{1}{8}$ in. in diameter. When the bark is cut it shows a very thin (less than $\frac{1}{16}$ in. thick) whitish outer layer and a thick inner layer pinkish brown in colour. Bark $\frac{5}{8}$ in. thick on a tree with a stem diameter of 2 ft. Young shoots, young branchlets, flowers, and underside of leaves more or less downy; the hairs on the branchlets are often rust-coloured, those on the flowers and underside of leaves paler or nearly white. Leaf-stalks $\frac{1}{4}$–$\frac{3}{8}$ in. long. Leaves alternate, lance-shaped or elliptical in outline, drawn out into a fairly long point at the apex; the midrib, lateral nerves, and net-veins visible on both surfaces, under surface mostly paler or nearly white; measurement of leaves, $2\frac{1}{2}$–5 in. long, $2\frac{1}{2}$–3 times as long as broad. Flowers downy with pale or nearly white hairs, in inflorescences (panicles) springing from the forks of the leaves, the panicles broad and shorter than the leaves. Flowers on small stalklets. Individual flowers about $\frac{1}{8}$ in. long; the outer part, the perianth, divided to about the middle into 6 lobes which are narrowly egg-shaped in outline. The perianth encloses 9 stamens arranged in 2 series; each stamen of the outer series is opposite to and attached near the base of each perianth lobe. The inner series is composed of 3 stamens alternating with 3 staminodia (undeveloped stamens) and each stamen of the inner series has 2 minute glands affixed on it near its base. The stamens of the outer series are shorter than the perianth lobes; those of the inner series are about as long as those of the outer series; the staminodia are shorter than the inner stamens and are pointed; the glands are smaller than the staminodia. The ovary, in the centre of the flower, is narrowly egg-shaped, hairless or nearly so, and tapers into a style at the apex. All the inner parts of the flower except the ovary are densely hairy. Fruit oval, $\frac{1}{2}$–$\frac{3}{4}$ in. long, black when ripe, the outer fleshy part enclosing a single large seed. After flowering, the perianth tube encloses the ovary and partly forms the outer fleshy covering of the fruit. The small scar at the apex of the fruit is that of the perianth lobes.

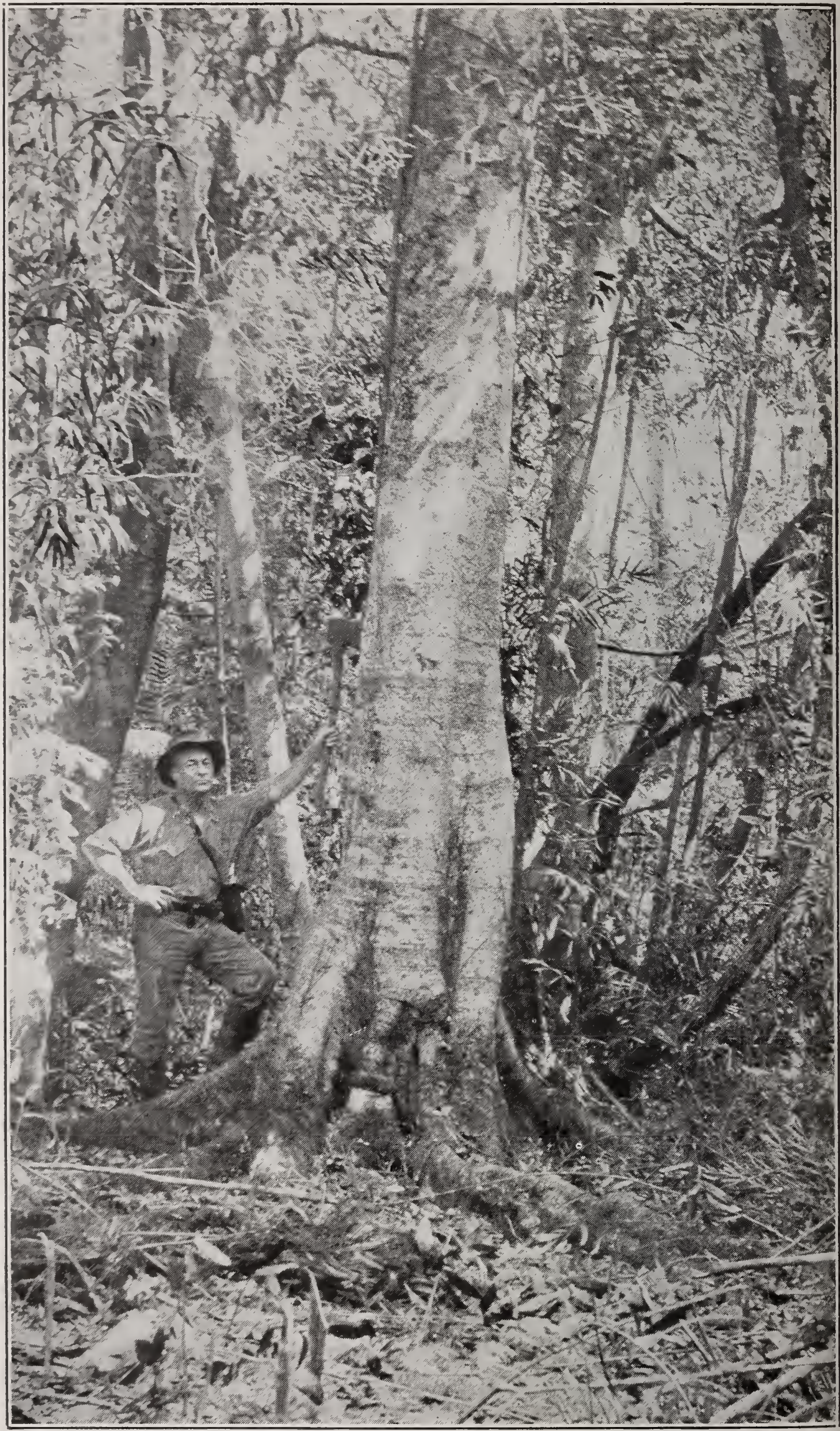


Fig. 67.—Cryptocarya patentinervis. Cedar Creek, westward from Eumundi, about 26.5° S. A Lawyer Palm (*Calamus Muelleri*) is shown on upper left side; leaves of same species are shown on right of tree stem.

(*Photo.: W. D. F.*)

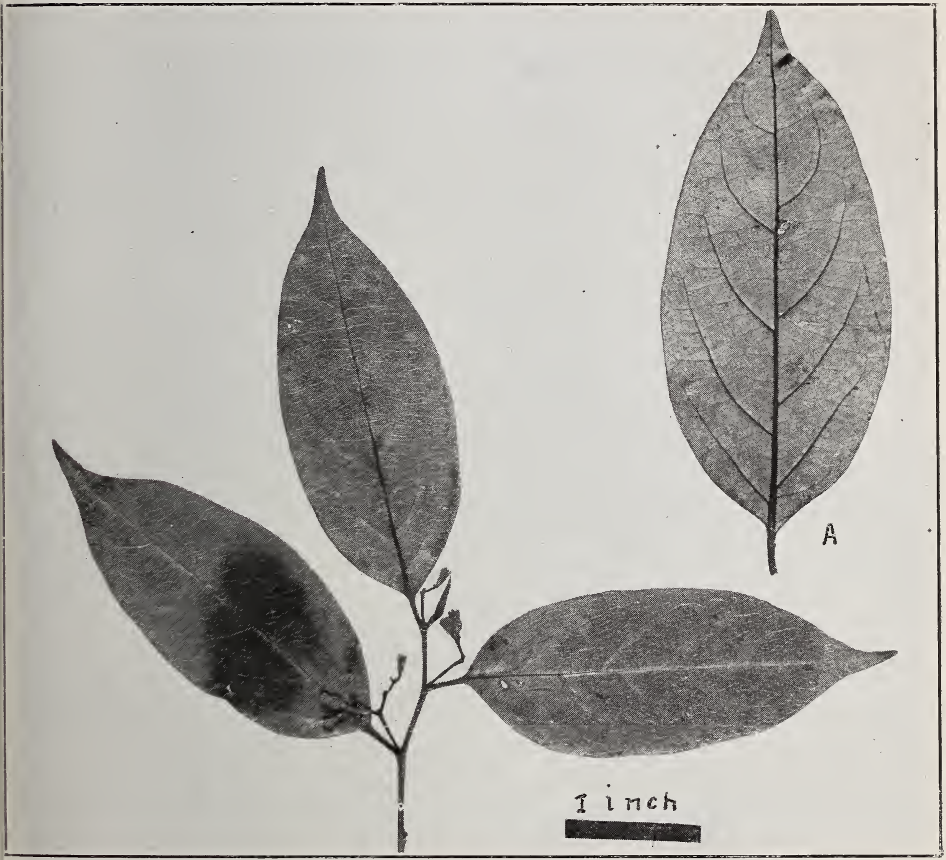


Fig. 68.—Cryptocarya patentinervis. A, showing underside of leaf; remainder, dry flower-bearing branchlet.

(Photo.: Dept. Agric. and Stock, Brisbane.)

Distribution.—Coastal scrubs from Hastings River, N.S.W. (J. H. Maiden), to Atherton Tableland, North Queensland.

Reference.—*Cryptocarya patentinervis* F.v.M. in A. de Candolle's Prodromus Systematis Naturalis Regni Vegetabilis, vol. 15, p. 508, 1864.

Cryptocarya foetida R.T.B. Tree attaining 50 ft. in height and 9 in. stem diameter (R. T. Baker). Leaves similar to those of *Beilschmiedia elliptica* (see Fig. 66) but somewhat larger. Fruits globular $\frac{1}{3}$–$\frac{5}{12}$ in. diameter. The offensive odour of the flowers is apparently similar to that of the flowers of *Beilschmiedia obtusifolia*, which attracts bees.—Richmond River (R. T. Baker).

Cryptocarya obovata R.Br. Pepper Berry tree, White Walnut. Figs. 69 and 70.

Derivation.—Cryptocarya from Greek *kryptos* concealed, *karyon* a nut (alluding to the perianth enclosing the seed); obovata Latin, reversed egg-shaped (alluding to the outline of the leaves).

Description.—A large tree attaining a height of 130 ft. and a stem diameter of over 3 ft. Stem often buttressed at the base. Bark grey, often slightly wrinkled and finely pustular; when cut, brown, measuring $\frac{1}{2}$ in. in thickness on a tree with a stem diameter of 2 ft. 3 in. Sapwood yellow. Young shoots, branchlets, underside of leaves, and flowers covered with a minute velvety down which is brown on the young branchlets and nearly white on the flowers. Leaf-stalks often fairly thick, $\frac{1}{8}$–$\frac{3}{10}$ in. long. Leaves alternate, oval, egg-shaped or reversed egg-shaped in outline, apex mostly rounded or blunt, upper surface smooth or hairless, underside finely downy, white or brown, the hairs on the raised midrib, lateral nerves, and net-veins of the underside mostly brown; measurement of leaf-blade $2\frac{1}{2}$–$4\frac{1}{2}$ in. long on flowering branchlets, often much longer on young trees, 2–3 times as long as broad. Flowers in inflorescences (panicles) in the forks of the leaves or at the ends of branchlets, the panicles mostly shorter than or nearly as long as the leaves. Individual flowers almost stalkless, covered with fine velvety hairs, each flower measuring about $\frac{1}{8}$ in. long, the outermost and largest part, the perianth, minutely downy, bell-shaped, divided to the middle into 6 oval lobes. Enclosed in the perianth are 9 stamens arranged in 2 series; the outer series consists of 6, each stamen being opposite to and inserted at the base of each perianth lobe; the inner series consists of 3 stamens alternating with 3 staminodia (abortive stamens) and with 2 glands, 1 on each side, at the base of each stamen. The ovary, in the centre of the flower, is oval and tapers into a narrow style at the apex. Fruit globular, turning black, about $\frac{1}{2}$ in. in diameter, the outer fleshy part enclosing a single large hard seed. After flowering, the perianth tube encloses the ovary and partly forms the outer fleshy covering of the fruit. The small scar at the top of the fruit is that of the perianth lobes. Flowering period about March.

Remarks.—The foliage of the species viewed from the ground often has a brown appearance; the stems are frequently very straight and tall.

Distribution.—Common in Queensland scrubs from the Tweed River on the south to Gympie on the north, and as far west as the Bunya Mountains (about 100 miles inland). N. S. Wales coastal scrubs from the Port Stephens district (J. H. Maiden) on the south to the Tweed River on the north.

Uses.—The timber should be useful for general indoor work.

Reference.—R. Brown, Prodromus Florae Novae-Hollandiae, p. 402.

Cryptocarya obovata var. **hypospodia.** North Queensland Pepper Berry.

References.—*Cryptocarya obovata* R. Brown, var. *hypospodia* White and Francis, new combination; *Cryptocarya hypospodia* F.v.M., Fragmenta Phytographiae Australiae, vol. v., p. 170, 1865–1866; *Cryptocarya obovata* R. Brown, var. *tropica* F. M. Bailey, Queensland Flora part iv., p. 1299, 1901.

Description.—This variety differs from typical *Cryptocarya obovata* in its leaves, which are frequently larger, especially in width, and are less white and less prominently veined on the underside.

Distribution.—Confined, so far as known, to tropical Queensland; as far south as Mackay and as far north as Atherton.

Cryptocarya glaucescens R.Br. Fig. 75. Tree attaining 70 ft. in height and 14 in. stem diameter. Bark brown with a few longitudinal cracks and a few large scales in places; when cut, brownish red, $\frac{3}{8}$–$\frac{1}{2}$ in. thick on tree with stem diameter of 14 in. Leaves similar to those of *Beilschmiedia elliptica* but whitish or pale on underside. Fruit black, of characteristic shape, one horizontal axis longer than the other and longer than vertical axis, about $\frac{1}{2}$ in. deep, $\frac{3}{4}$ in. broad in one direction and $\frac{1}{2}$ in. in the other.—Milton (Maiden) to Rockingham Bay (Benth.).

Cryptocarya microneura Meissn. (*C glaucescens* R.Br., var. *reticulata* Meissn.). Murrogun. A tree over 60 ft. high (Maid. and Baker). Branchlets smooth. Leaves alternate ; stalks $\frac{1}{4}$–$\frac{3}{8}$ in. ; blades reversed lance-shaped or narrowly elliptical, protracted into a blunt point at apex, narrowed at base, midrib and 5–7 lateral nerves on each side of it visible on both surfaces, net-veins numerous, fine and fairly prominent on both surfaces, 3–5 in. long, 3–4 times as long as broad. Flowers in panicles at ends of branchlets and in forks of upper leaves. Individual flowers finely downy, about $\frac{1}{6}$ in. long, the perianth tube measuring about $\frac{1}{12}$ in. long and the 6 perianth lobes each about $\frac{1}{12}$ in. long. Fruit black, globose, $\frac{1}{2}$–$\frac{5}{8}$ in. diameter.—Kiama (Maiden) to Brisbane.

Cryptocarya erythroxylon M. & B. Southern Maple, Red-wooded *Cryptocarya*, Pigeon Berry Ash, Rose Walnut. Figs. 71 and 72.

Derivation.—Greek *kryptos* concealed, *karyon* a nut (alluding to the perianth enclosing the seed) ; *erythros* red, *xylon* wood.

Description.—A large tree attaining about 120 ft. in height and a stem diameter of about 4 ft. Stem not prominently buttressed. Bark grey, occasionally somewhat wrinkled and sometimes slightly scaly ; when cut, brown ; lighter towards sapwood ; $\frac{7}{8}$ in. thick on a tree with a stem diameter of 3 ft. 6 in. Sapwood white. The branchlets often dry black or dark brown. Young shoots and inflorescence slightly downy with minute hairs. Leaf-stalks $\frac{1}{4}$–$\frac{5}{8}$ in. long. Leaves alternate, elliptical in outline, rounded or narrowed at the base, blunt or often protracted into a short blunt point at the apex, upper surface green, under surface paler and often greyish white, lateral nerves and net-veins visible on both surfaces but more prominent on the underside ; measurement of leaf-blade, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, 2–$2\frac{1}{2}$ times as long as broad. Flowers in inflorescences (panicles) in the forks of the upper leaves or at the ends of the branchlets, the inflorescences shorter than or as long as the leaves. Stalklets of individual flowers short. Flowers about $\frac{1}{12}$ in. long ; the outermost and longest part, the perianth, divided to the middle into 6 minutely hairy lobes, the lower undivided part of the perianth narrower than the upper lobed part. Within the perianth and shorter than it are 2 series of stamens ; the outer row, consisting of 6, are opposite to and almost inserted on the inside of each perianth lobe ; the inner row consists of 3 perfect stamens alternating with 3 staminodia, each perfect stamen with 2 glands at its base, one on each side. In the centre of the flower and enclosed in the lower part of the perianth is the egg-shaped ovary which tapers at its apex into a style. In the development of the fruit the lower part of the perianth unites with the ovary and encloses it. The fruit is globular or a little longer than broad, is crowned by the remains of the perianth lobes, is about $\frac{1}{2}$ in. in diameter, and contains a single large seed. (The description of the flowers is adapted from Maiden and Betche's description in the Forest Flora of N. S. Wales, vol. iii., p. 111.)

Distribution.—Scrubs of the Macpherson Range on both sides of the border between N. S. Wales and Queensland.

Uses.—The timber is cut by the sawmills in the localities where the trees are plentiful, and is used for indoor work.

Reference.—*Cryptocarya erythroxylon* Maiden and Betche in Maiden's Forest Flora of N. S. Wales, vol. 3, p. 111, 1908.

Cryptocarya foveolata W. & F. Small-leaved *Cryptocarya*. Figs. 73 and 74.

Derivation.—Cryptocarya from Greek *kryptos* concealed, *karyon* a nut (referring to the perianth enclosing the seed) ; foveolata Latin, minutely pitted (referring to the hollow glands on the underside of the leaves—see description below).

Description.—A tree attaining a height of about 100 ft. and a stem diameter of 2 ft. Stem not prominently buttressed. Bark brown, fairly smooth ; when cut, light brown, $\frac{7}{16}$ in. thick on a tree with a stem diameter of 1 ft. 9 in. Sapwood white. Young shoots finely downy. Leaf-stalks $\frac{1}{8}$–$\frac{1}{3}$ in. long. Leaves alternate, egg-shaped, lance-shaped, or elliptical in outline, protracted into a rather blunt point at the apex, with 2 prominent lateral nerves, 1 on each side of the midrib, proceeding from or near the base of the leaf. The most prominent feature of the leaves is the 1 or 2 pairs of hollow glands (situated along the midrib at the junctions of the principal lateral nerves) with apertures on the underside of the leaf. Net-veins conspicuous on the underside of the leaves. Measurement of leaf-blade $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $1\frac{1}{2}$–2 times as long as broad. No flowers available. Judging by the fruiting specimens the flowers appear to have been in inflorescences (panicles or racemes) at the ends of branchlets or in the forks of the leaves, the inflorescences being decidedly shorter than the leaves. Fruit black, globular, about $\frac{1}{2}$ in. diameter, crowned by the minute circular scar of the perianth tube, the fleshy outer part enclosing a single large round seed.

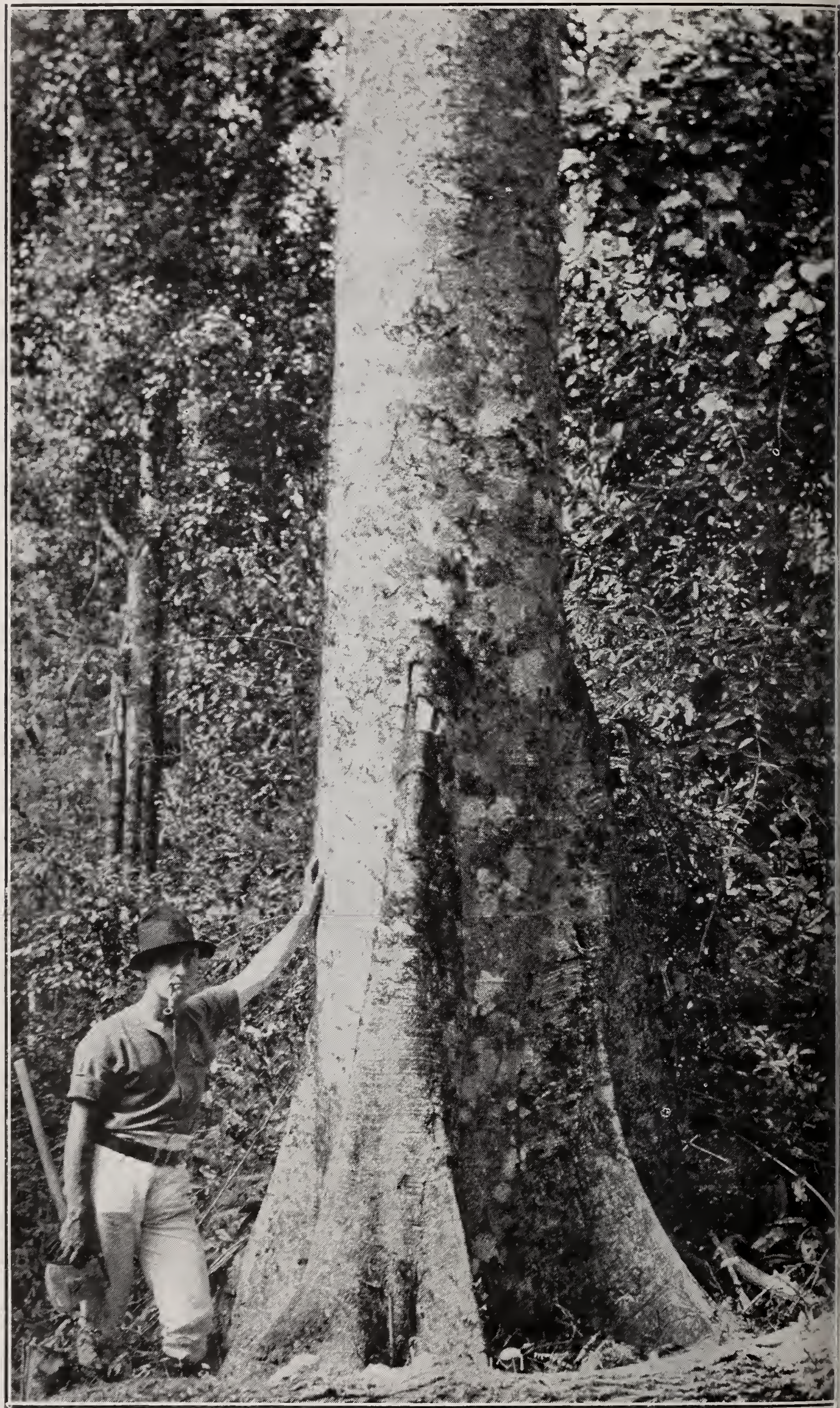


Fig. 69.—Pepperberry Tree (*Cryptocarya obovata*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

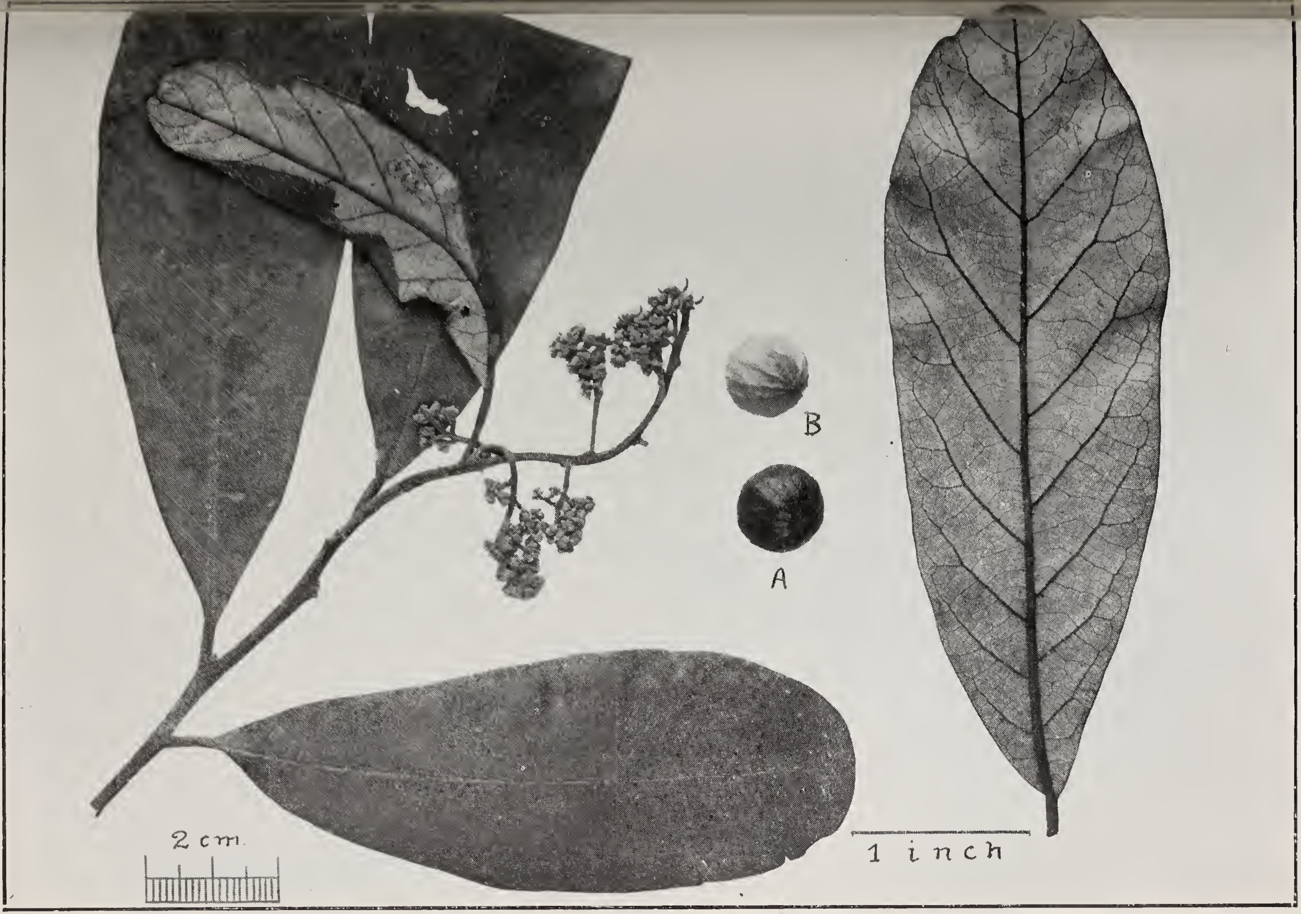


Fig. 70.—Pepperberry Tree (*Cryptocarya obovata*). A, fruit; B, seed. The leaf on right shows its underside. On left, branchlet with dry flowers. All in dry state. (*Photo.: Dept. Agric. and Stock, Brisbane.*)

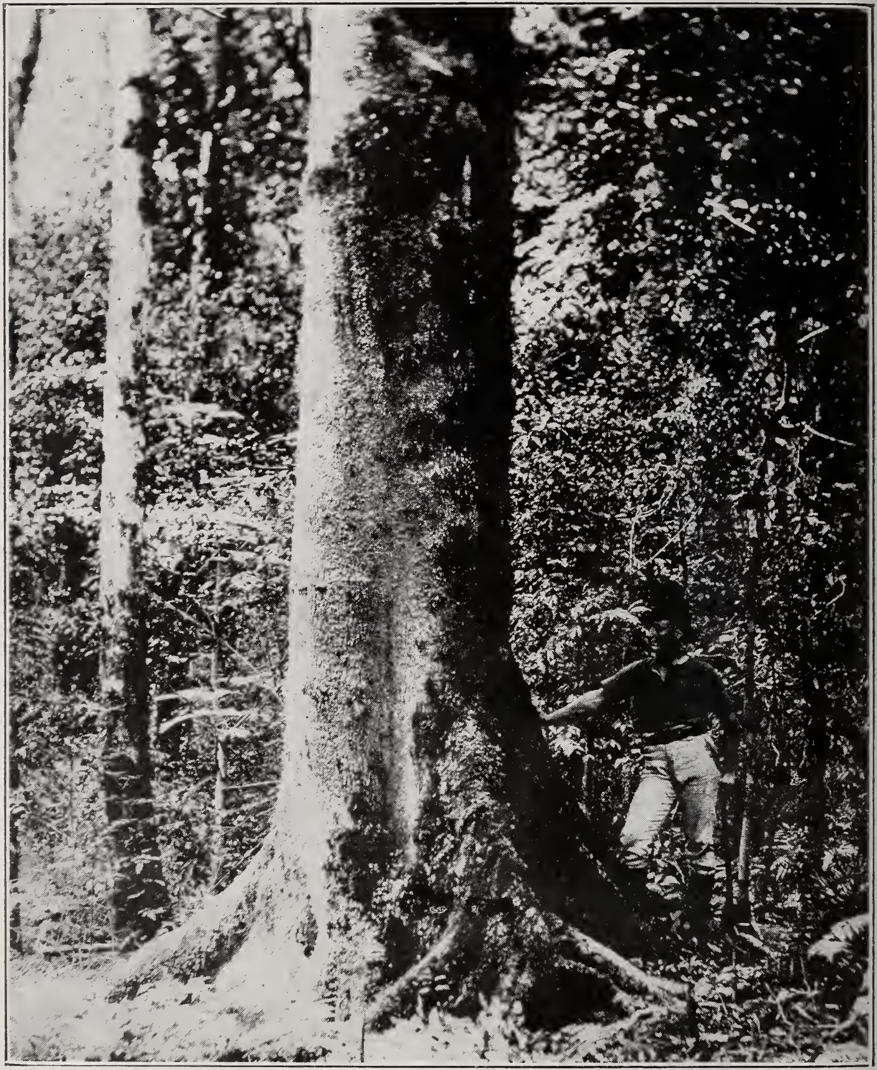


Fig. 71.—Southern Maple (*Cryptocarya erythroxylon*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

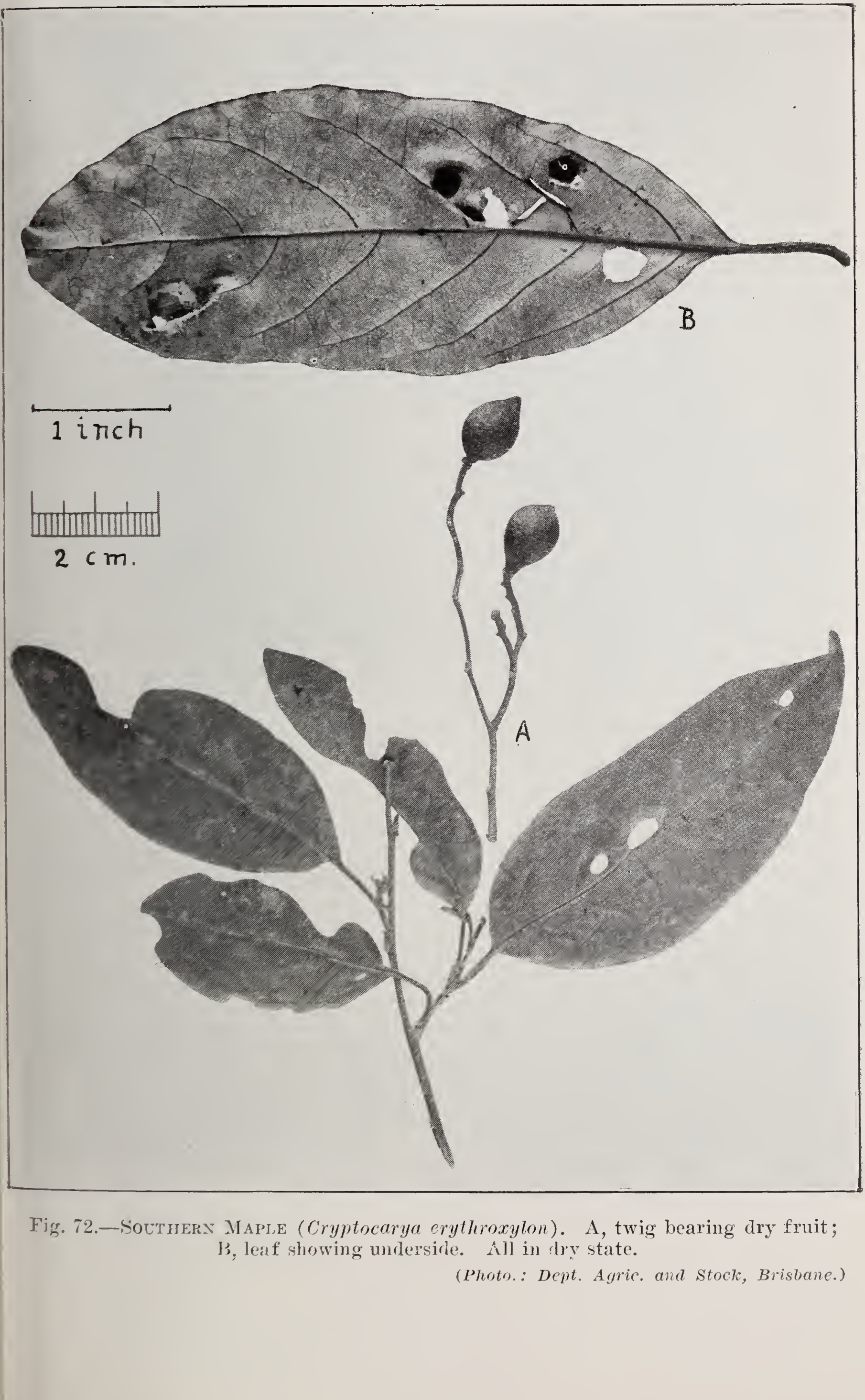


Fig. 72.—SOUTHERN MAPLE (*Cryptocarya erythroxylon*). A, twig bearing dry fruit; B, leaf showing underside. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

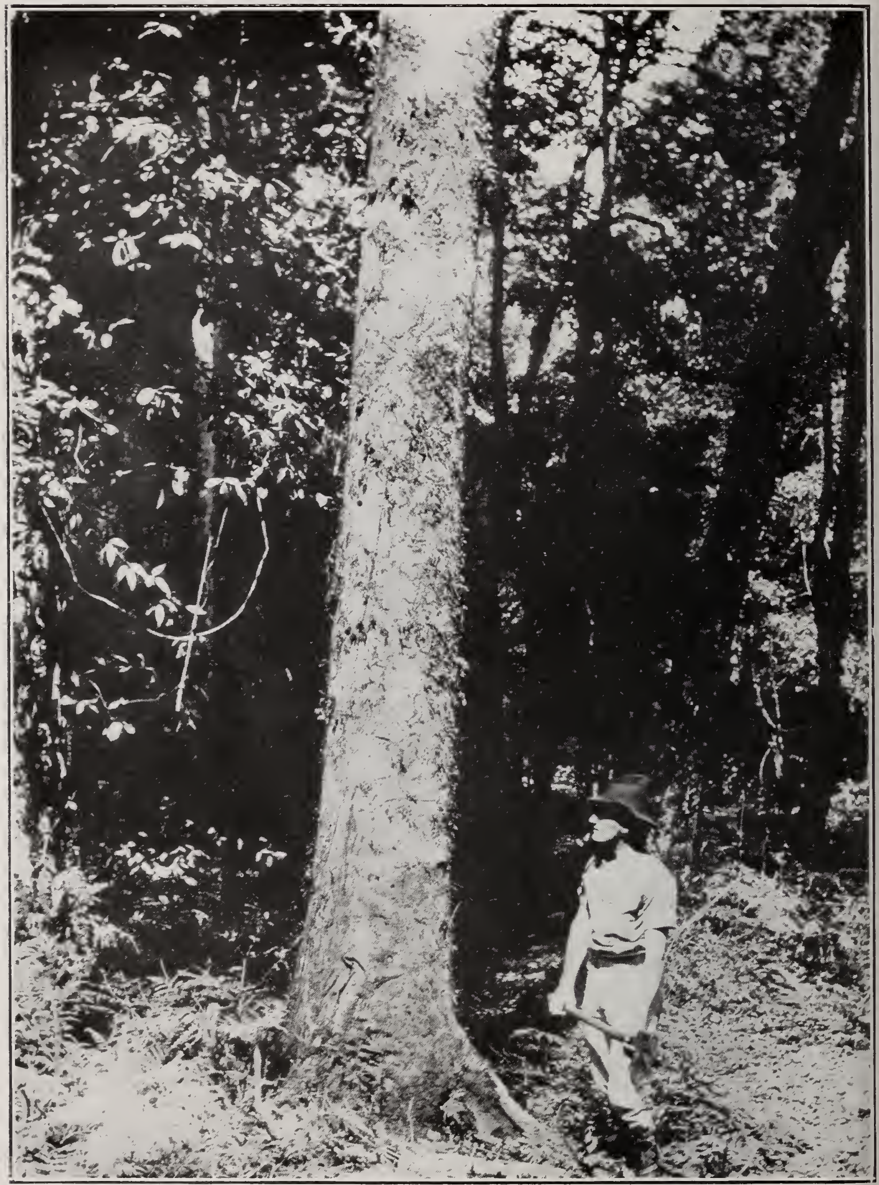


Fig. 73.—Cryptocarya foveolata. Ranges east of Emu Vale, near Killarney, about 28.4° S. The stem is covered to a great extent by *Fieldia australis*.

(*Photo.: W. D. F.*)

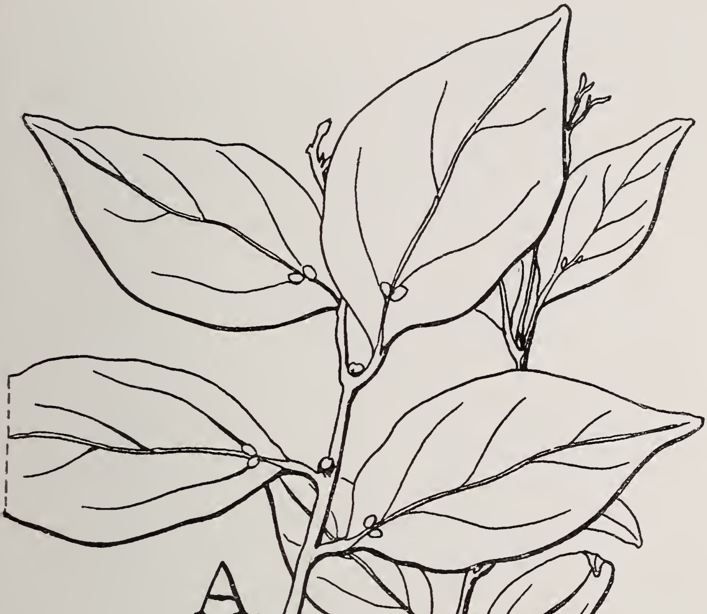


Fig. 74.—CRYPTOCARYA FOVEOLATA. A, branchlet from young tree; B, branchlet from ature tree; C and E, fruit at different stages; D, leaf, showing underside. All natural size. rom paper by C. T. White and W. D. Francis, Proc. Roy. Soc. Queensland, vol. 35.

Distribution.—Macpherson Range, National Park, Mt. Mistake, and ranges about Killarney. It is a common tree in the higher altitudes (2,000 ft. and over) of the foregoing localities.

Uses.—The tree is not well enough known in a practical way to define its uses.

References.—*Cryptocarya foveolata* C. T. White and W. D. Francis, Proceedings of Royal Society of Queensland, vol. 35, p. 75, 1924; *Cryptocarya cinnamomifolia* Bentham, var. *parvifolia* F. M. Bailey, Queensland Flora, vol. iv., p. 1301, 1901.

Cryptocarya triplinervis R.Br. Generally a small, bushy tree about 20 ft. high. Leaves comparable with those of *Cryptocarya patentinervis* (*see* Fig. 68) but rather longer, the basal pair of nerves more prominent and traversing the greater part of the length of the leaf; the underside of the leaves is hairy. Fruit globose or egg-shaped, about ½ in. diameter.—Clarence River (Benth.) to Daintree River; Lord Howe Id. (Maid.); Papua (C. T. White).

Cryptocarya Meissneri F.v.M. Tree 50 ft. high and 2–3 ft. stem diameter (J. H. Maiden). Leaf-stalks ⅛–¼ in. long. Leaf-blades lance-shaped, narrowed gradually towards base, apex often drawn out into a long, conspicuous blunt point, 2–3½ in. long, 2½–3 times as long as broad, venation indistinct, lateral nerves and a few net-veins only faintly visible.—Hastings River (F.v.M.) to Logan River (Queensland).

Cryptocarya australis Benth. Shrub. Leaves glossy above with a prominent pair of basal nerves traversing greater part of length of leaf. Fruit red, globose, about ¾ in. diameter, the fleshy outer part enclosing a longitudinally ribbed hard part enclosing the seed.—Clarence River (Benth.) to Cairns.

5. ENDIANDRA.

Endiandra discolor Benth. Domatia Tree. Figs. 75 and 76.

Derivation.—Endiandra from Greek *endon* within, *aner, andros* a man (alluding to the inner series of stamens—the male organs—being the fertile ones); Latin *discolor*, of different colours (signifying the unlikeness in colour of the two leaf surfaces).

Description.—A tree attaining a height of 120 ft. and a stem diameter of 3 ft. Stem buttressed, the buttresses often with edges curving outwards as in *Sloanea Woollsii.* Bark brown, sometimes mottled with grey, somewhat scaly; when cut, very dark red, measuring ½ in. thick on a tree with a stem diameter of 2 ft. All parts hairless except the very young shoots and the inflorescence which bear minute hairs. Leaves alternate. Leaf-stalks ⅕–⅖ in. long. Leaf-blades elliptical, egg-shaped or reversed egg-shaped in outline, narrowed towards the base, blunt or slightly drawn out into a blunt point at the apex, upper surface green, under surface paler or sometimes grey; midrib, lateral nerves, and very numerous minute net-veins visible on both surfaces; on the underside where the lateral nerves join the midrib there are generally conspicuous hollow glands (domatia); measurement of leaf-blade, 2½–4 in. long, 2–3 times as long as broad. Flowers in inflorescences (panicles) in the forks (axils) of the leaves or at the ends of branchlets, the inflorescences mostly shorter than the leaves. Individual flowers on short stalklets almost or as long as the flower. The flowers each measure about 1/12 in. long; the outer part is composed of a bell-shaped finely hairy perianth which bears at its rim 6 lobes which are egg-shaped in outline and measure about 1/24 in. long. The perianth encloses 3 stamens alternating with 3 somewhat smaller organs (staminodia); at the base of the very short stalklets (filaments) of each stamen there are 2 minute globose glands. The anthers of the 3 stamens are lance-shaped or egg-shaped and open at the sides by means of minute circular pores. The ovary is also enclosed in the perianth and is situated in the centre of the flower; it is egg-shaped and tapers towards the apex. Fruit oval, attaining about 1 in. in length, and bearing at its base the remains of the perianth. The fruit contains a single large seed. Flowering period: November–December.

Distribution.—Coastal scrubs of Eastern Australia from Gosford, N.S.W. (J. H. Maiden), to Rockingham Bay, North Queensland (Bentham).

Reference.—*Endiandra discolor* Bentham, Flora Australiensis, vol. 5, p. 301, 1870.

Endiandra globosa Maid. & Betche. Tall, straight-stemmed tree (J. H. Maiden). Leaves strongly veined but not so conspicuously as in *Endiandra compressa* (*see* Fig. 78); stalks ⅜ in. long, blades 5–5½ in. long, 2½ times as long as broad, 8–9 lateral nerves on each side of midrib, drawn out into a decided blunt point at apex. Fruit globular, 2 in. diameter with a thin outer fleshy layer.—Murwillumbah, N.S.W.

Endiandra virens F.v.M. Tree about 25 ft. high and 9 in. stem diameter. Bark light grey or almost white. Leaves resembling those of *Endiandra compressa* (*see* Fig. 78). Fruit globular, yellow, almost 2 in. diameter, outer yellow pulp enclosing a hard inner globose part which encloses the seed. Small, hard, pustular, grey, gall-like bodies about ⅜ in. diameter are sometimes seen on the branchlets.—Comboyne (Maiden to Gympie.

Endiandra Muelleri Meissn. Tree about 25 ft. high (J. H. Maiden). Leaves resembling those of *Endiandra compressa* (*see* Fig. 78) but somewhat broader. Fruit globose, $\frac{3}{8}$–$\frac{1}{2}$ in. diameter.—Hastings River (Benth.) to Macpherson Range.

Endiandra pubens Meissn. Tree about 40 ft. high. Leaves strongly veined as in *Endiandra compressa* (*see* Fig. 78). Leaf-stalks $\frac{3}{8}$–$\frac{3}{4}$ in. long; blades egg-shaped or elliptical in outline, 3–8 in. long, twice as long as broad, rusty hairy on underside. Fruit pink when ripe (J. F. Bailey), globose, attaining 2$\frac{1}{2}$ in. diameter in Northern specimens, outer part fleshy. Young shoots, young branchlets, leaf-stalks, and inflorescence rusty hairy, often very densely so. North Queensland specimens have larger leaves and denser hairiness than Southern ones.—Bellinger River (Benth.) to Cairns. Synonyms: *Endiandra insignis* F. M. Bailey, *Cryptocarya Muelleri* Meissn.

Endiandra compressa C.T.W. Whitebark, Queensland Greenheart. Figs. 77 and 78.

Derivation.—Endiandra from Greek *endon* within, *aner*, *andros* a man (alluding to the inner series of stamens—the male organs—being the fertile ones); compressa Latin, pressed together or flattened (referring to the flattened fruits of the specimens from which the species was described).

Description.—A tree attaining a height of 100 ft. and a stem diameter of 1 ft. 8 in. Stem not buttressed. Bark fairly smooth, whitish grey or nearly white. When the bark is cut it shows an outer, thin, maroon-coloured layer and an inner brownish yellow layer; total thickness of bark $\frac{1}{4}$ in. on a tree with a stem diameter of 1 ft. 8 in. All parts hairless except the very young shoots and parts of the inflorescence which are clothed with a few scattered, minute, greyish hairs. Leaves alternate. Leaf-stalks about $\frac{1}{2}$ in. long. Leaf-blades lance-shaped or elliptical, narrowed at both ends, margins often wavy; midrib, lateral nerves, and net-veins very conspicuous on both surfaces; measurement of leaf-blades, 3–5$\frac{1}{2}$ in. long, 2$\frac{1}{2}$–3$\frac{1}{2}$ times as long as broad. Flowers in inflorescences (panicles) springing from the forks (axils) of the leaves or from above the scars of fallen leaves, the panicles sometimes almost as long as the leaves. Stalklets of individual flowers attaining $\frac{1}{6}$ in. in length. Individual flowers about $\frac{1}{8}$ in. in diameter when expanded. The outer and largest part of the flower consists of a perianth which is divided at the rim into 6 almost triangular lobes, each lobe measuring about $\frac{1}{24}$ in. long. The inner part of the perianth and its lobes is densely clothed with short brown hairs. The perianth bears on its inner side 3 thick fleshy stamens which open in circular pores at their sides. The perianth also bears near the base of the stamens 6 broad flat hairless glands, 2 glands being associated with each stamen. The ovary in the centre of the flower is minute globose and hairless. There are no staminodia between the stamens. Fruit bluish black in colour, globose or laterally compressed, attaining 2 in. in diameter. The outer pulp of the fruit surrounds a firm shell $\frac{1}{6}$–$\frac{1}{18}$ in. thick. The firm shell covers the seed, which attains 1$\frac{1}{4}$ in. in diameter. Fruiting period: September–October.

Distribution.—Confined to Queensland. Scrubs between Gympie on the north and Tambourine Mountain on the south; common at Imbil and on Blackall Range.

Reference.—*Endiandra compressa* C. T. White, Botany Bulletin No. 21, p. 15, 1919 (Dept. Agriculture and Stock, Brisbane).

Family HERNANDIACEAE.

Hernandia bivalvis Benth. Tree up to 40 ft. high and 10 in. stem diameter. Bark with tendency to scaliness, white when cut. Leaves alternate; stalks 1–1$\frac{1}{4}$ in. long, blades egg-shaped in outline, broad and rounded at base, tapering towards apex and drawn out into an obtuse point; midrib, lateral nerves, and a few net-veins visible on both surfaces; 3–5 lateral nerves on each side of midrib, basal pair of lateral nerves prominent and springing from insertion of stalk, blade 2–3$\frac{1}{2}$ in. long, 2–3 times as long as broad. Flowers surrounded by 3 or 4 hairy bracts, egg-shaped in outline and $\frac{1}{4}$–$\frac{3}{8}$ in. long. Bracts enclosing fruit mostly 3, each bract broad, red, concave and veined, 1$\frac{3}{4}$–2 in. long. Fruit black, egg-shaped, with about 10 longitudinal ribs, almost 1 in. long.—Brisbane River and Wide Bay.

Family CAPPARIDACEAE.

Capparis nobilis F.v.M. Native Pomegranate. Small tree up to 20 ft. in height and 4 in. stem diameter. Stem and branches armed with scattered rigid prickles, bark dark grey or nearly black. Leaves alternate; stalks $\frac{1}{4}$–$\frac{3}{4}$ in., blades 2$\frac{1}{2}$–4$\frac{1}{2}$ in. long, 2$\frac{1}{2}$–3$\frac{1}{2}$ times as long as broad. Flowers over 1 in. diameter. Fruit globose, hard, attaining 2 in. diameter, containing several seeds.—Hunter River (Maiden) to Rockhampton.

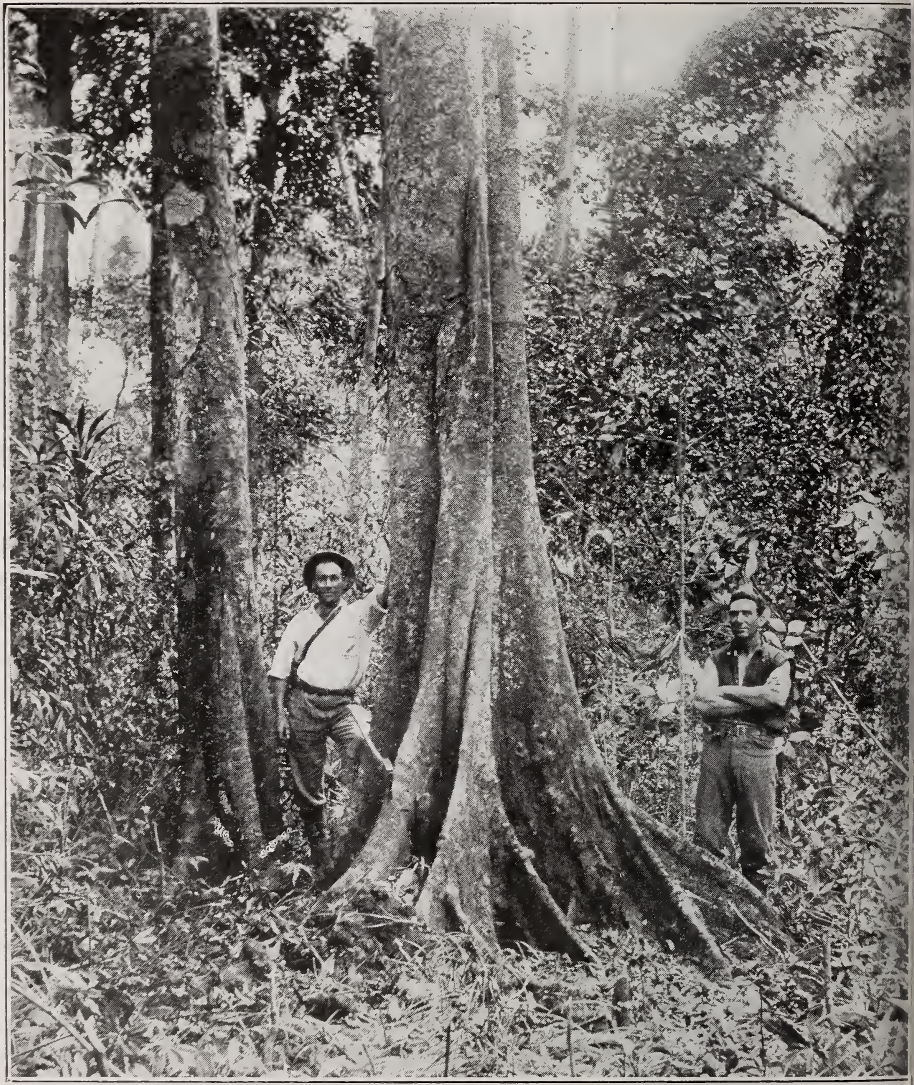


Fig. 75.—Domatia Tree (*Endiandra discolor*). Cedar Creek, west of Eumundi, about 26.5° S. The tree on left is *Cryptocarya glaucescens*, and to left of it the long-leaved, erect plant is *Cordyline terminalis*.

(*Photo.: W. D. F.*)

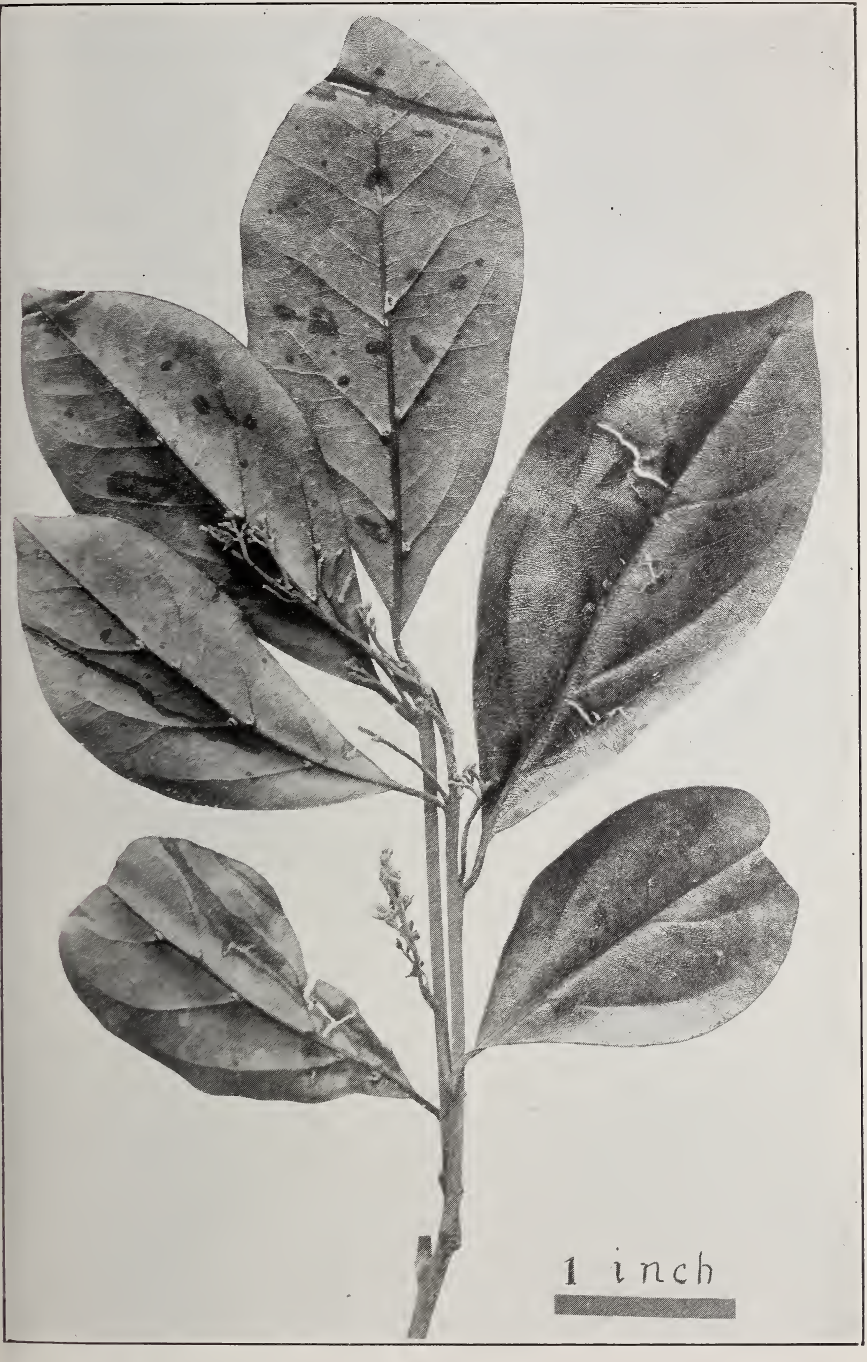


Fig. 76.—Domatia Tree (*Endiandra discolor*). Branchlet bearing immature flowers. The hollow glands on the underside of leaf along the midrib are conspicuous. All in dry state. *(Photo.: Dept. Agric. and Stock, Brisbane.)*

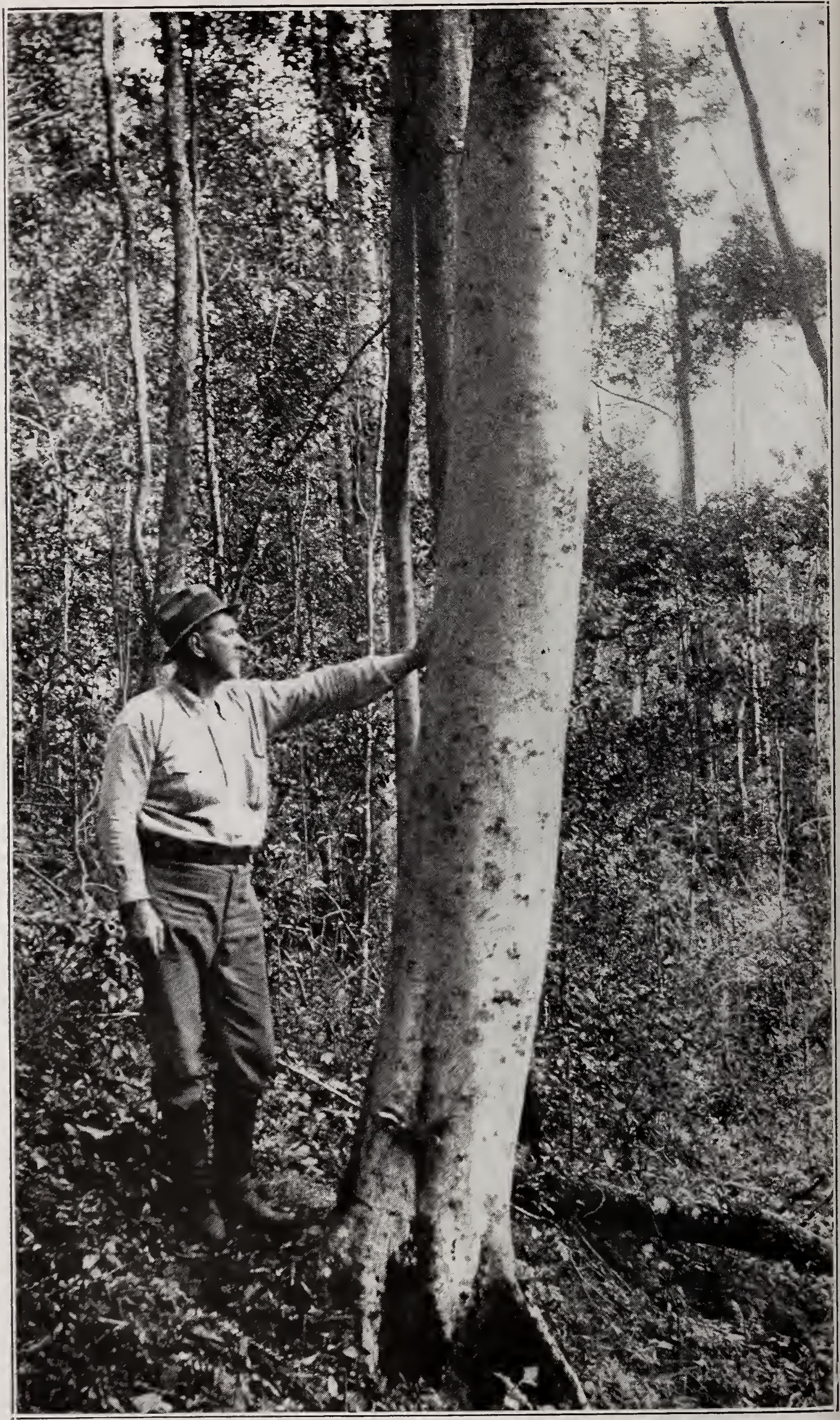


Fig. 77.—Whitebark (*Endiandra compressa*). Imbil, about 26.4° S.

(*Photo.: W. D. F.*)

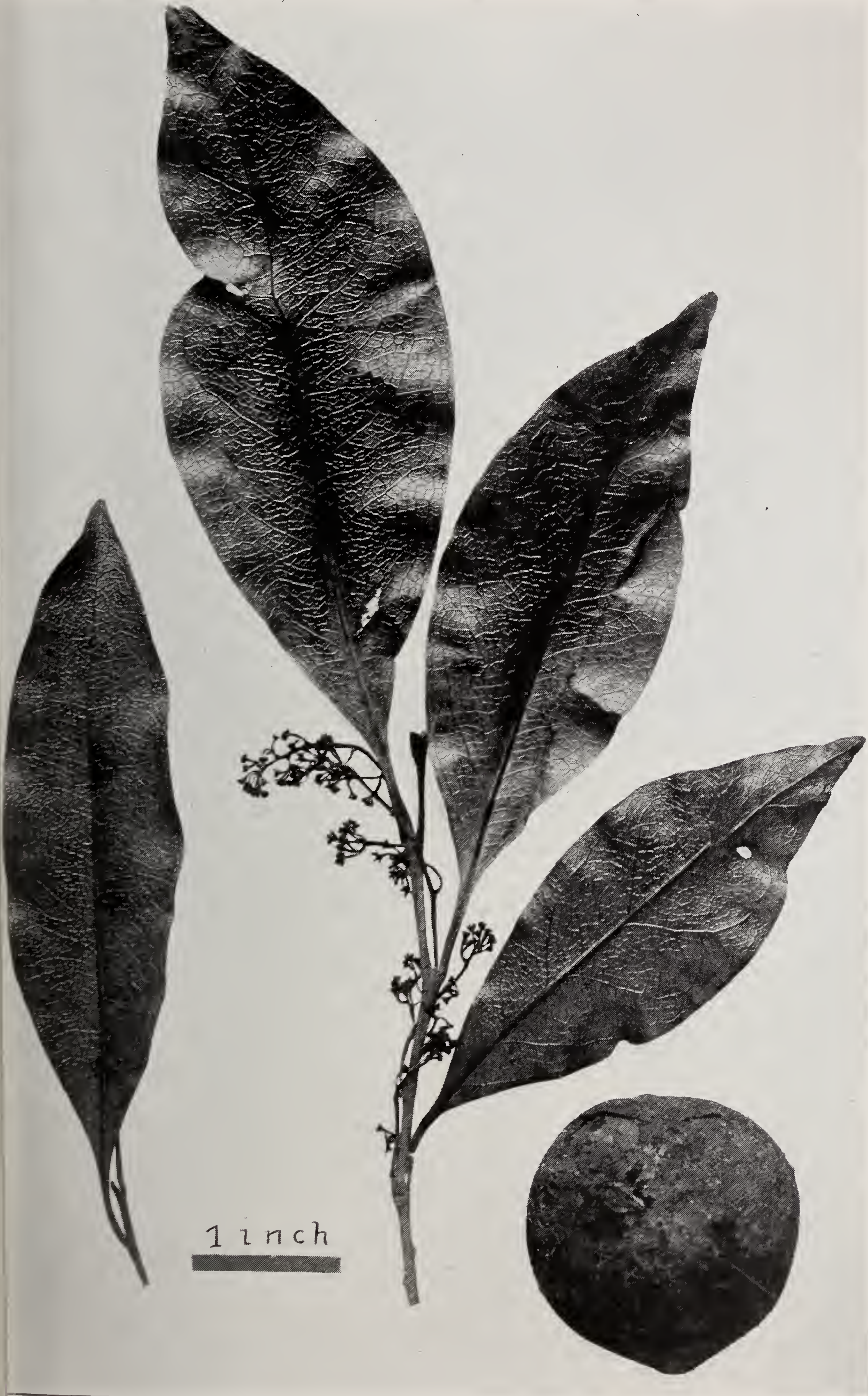


Fig. 78.—WHITEBARK (*Endiandra compressa*). Flower-bearing branchlet. Dry fruit on right. All in dry state.
(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Family SAXIFRAGACEAE.

Leaves alternate. Fruit not succulent, capsular.
  Leaf margins distantly toothed. Calyx at base of young fruit. Fruit opening at apex in 4 or 5 small teeth .. .. 1. *Cuttsia.*
  Leaf margins not toothed. The 5 calyx lobes forming a rim near apex of fruit which is surmounted by the 5 styles .. .. .. 2. *Quintinia.*
  Leaf margins toothed, blades over 5 in. long. Capsule opening from apex in 2 valves .. .. 4. *Anopterus.*
Leaves opposite or in groups (whorls) of 3. Fruit a berry.
  Leaf margins toothed. Berry with 8–10 longitudinal ribs .. 3. *Polyosma.*

1. CUTTSIA.

Cuttsia viburnea F.v.M. Small bushy tree 20 ft. high. Leaves alternate, stalks $\frac{3}{8}$–1 in.; blades tapering at base, drawn out into long point at apex, margins distantly toothed, 3$\frac{1}{2}$–6$\frac{1}{2}$ in. long, 3–4 times as long as broad. Inflorescence many-flowered, at ends of branchlets. Capsules egg-shaped, $\frac{1}{8}$ in. long, opening at apex in 4 or 5 triangular, broad, small teeth. Frequent along watercourses.—Macpherson Range, Mt. Mistake, Logan River.

2. QUINTINIA.

Quintinia Sieberi A.DC. Opossum Wood (may originate from the peculiar wrinkles of the bark, which might have been attributed by bushmen to the scars left by the claws of opossums). Figs. 79 and 80.

Derivation.—Quintinia, in memory of La Quintinie, a French botanist; Sieberi, after F. W. Sieber, a botanical collector, of Prague, Bohemia, who spent seven months in collecting plants in New South Wales in 1823 (J. H. Maiden).

Description.—A tree attaining a height of 70 ft. and a stem diameter of 2 ft. Stem not prominently flanged at base. Bark dark brown, sometimes almost black, often wrinkled and with a row of scales on each side of the wrinkles; when cut, light brown, white near sapwood; measurement of bark, $\frac{3}{8}$ in. thick on a tree with a stem diameter of 1 ft. 9 in. Sapwood white. Branchlets, leaves, and inflorescence hairless. Leaf-stalks $\frac{3}{8}$–$\frac{3}{4}$ in. long. Leaves alternate, egg-shaped or elliptical in outline, mostly protracted into a short blunt point at the apex, lateral nerves and net-veins visible on both surfaces; measurement of leaf-blade 3–4 in. long, 2–3 times as long as broad. Flowers in inflorescences (panicles with branches consisting of racemes) at the ends of branchlets; the inflorescences, which are about as long as they are broad, are often about as long as the leaves. Stalklets of flowers about $\frac{1}{16}$ in. long. Flowers about $\frac{1}{2}$ in. diameter when expanded; the lowermost part, the calyx, funnel-shaped, about $\frac{1}{8}$ in. diameter, with 5 minute triangular lobes at the rim. Above the calyx are the 5 petals each over $\frac{1}{8}$ in. long. Alternating with the petals and shorter than them are 5 stamens. The ovary, in centre of flower, is surmounted by a finely 3–5 furrowed style nearly $\frac{1}{8}$ in. long. Fruiting capsule nearly $\frac{1}{8}$ in. diameter, 3–5 celled, with several seeds in each cell, the 5 persistent calyx teeth forming a rim near the apex, and the 5 styles separating from the base to near the summit and persistent on the capsule at its apex. Seeds brown, less than $\frac{1}{16}$ in. long. Flowering period: October and November; in fruit in December and January.

Distribution.—Common in the scrubs of the higher altitudes of Macpherson Range National Park, ranges near Killarney, and Mistake Mountains. New South Wales from near the Victorian Border on the south to the Tweed River on the north (J. H Maiden); common in the scrub of the gorges of the Blue Mountains.

Uses.—Very little appears to be known about the commercial value of the timber.

Remarks.—It is a remarkable fact that this tree generally begins life on the trunk of tree ferns, where the seed germinates and the young trees develop.

Reference.—*Quintinia Sieberi*, A. de Candolle, Monog. Camp. 92, 1830.

Quintinia Verdonii F.v.M. Differs from *Quintinia Sieberi* in its inflorescence which consists of long narrow racemes each of which springs from the fork (axil) of leaf.—Manning River (Maiden) to Maroochy River.

3. POLYOSMA.

Polyosma Cunninghamii J. J. Benn. Tree attaining 40 ft. in height and 8 in stem diameter. Leaves opposite, stalks $\frac{1}{4}$–$\frac{5}{8}$ in.; blades lance-shaped, often broade in upper part, margins toothed, 2–4$\frac{1}{2}$ in. long, 2–4 times as long as broad. Flower in terminal racemes. Fruit black, egg-shaped, up to $\frac{3}{4}$ in. long, prominently fluted longitudinal ribs 8–10.—Wollongong (Maiden) to Gympie.

4. ANOPTERUS.

Anopterus Macleayanus F.v.M. Shrub or tree (?). Leaves alternate, reversed lance-shaped, fleshy and toothed, blade gradually narrowed into indistinct stalk, blades 5 or more inches long, at least 4 times as long as broad. Flowers in racemes at ends of branchlets. Capsules fully ½ in. long, opening from apex in 2 valves.—Hastings River (Benth.) to Macpherson Range.

Family PITTOSPORACEAE.

Flowers under ¾ in. long. Seeds not winged .. .. .. 1. *Pittosporum.*
Flowers over ¾ in. long. Seeds flat, surrounded by a membranous wing .. .. 2. *Hymenosporum.*

1. PITTOSPORUM.

Pittosporum rhombifolium A. Cunn. Small tree. Leaves alternate or approximated in groups of 3–5 at ends of branchlets or at nodes ; stalks ⅜–1 in. ; blades broadly lance-shaped, margins toothed in upper part, margins of lower part straight and both sides converging into stalk, 2–4 in. long, 2–3 times as long as broad. Fruit yellow, pear-shaped, ⅜ in. long, each containing 2–3 black seeds.—Clarence River (Benth.) to Proserpine.

Pittosporum undulatum Vent. Small tree. Leaves approximated in groups of 3–6 at ends of branchlets or at nodes ; stalks ⅜–⅝ in. ; blades lance-shaped with wavy margins, 2¾–4¼ in. long, 3–3½ times as long as broad. Capsule globose, ⅜–½ in. diameter, with numerous (about 13) black seeds.—Western Port (Benth.) to Logan River.

Pittosporum revolutum Ait. Shrub. Leaves approximated in groups of 4–8 at ends of branchlets ; stalks ⅜–¾ in. ; blades reversed lance-shaped, margins somewhat wavy, undersides with rust-coloured hairs readily rubbed off, 2½–5 in. long, 2–3 times as long as broad. Fruit egg-shaped, 1 in. long, opening in 2 or 3 valves. Seeds globose, red, with sticky surface.—South-east Gippsland (Benth.) to Gympie.

2. HYMENOSPORUM.

Hymenosporum flavum F.v.M. Native Frangipani. Tree attaining 70 ft. in height and 16 in. stem diameter. Bark marked by transversely elongated lenticels, when cut cream-coloured, ¼ in. thick on tree with stem 16 in. diameter. Foregoing description and dimensions apply to trees on Eungella Range (west of Mackay) ; Southern trees are smaller. Leaves alternate ; stalks ⅜–⅝ in. ; blades drawn out into fine point at apex, gradually narrowed towards base, broadest in upper part, 3–5½ in. long, 2½–3 times as long as broad. Flowers over 1 in. long and 1 in. diameter, yellow, fragrant. Flowering in October–November.—Hunter River (Benth.) to Atherton.

Family CUNONIACEAE.

Fruit splitting open (capsular).
- Leaflets 3. Capsule 2-celled, almost cylindrical .. .. 1. *Geissois.*
- Leaflets 3–7. Capsule globose, 2–5-celled. Seeds covered by fine, twisted hairs .. .. 2. *Ackama.*
- Leaflets 3. Capsule 2-celled, egg-shaped, woolly or hairy .. 5. *Weinmannia.*
- Leaves simple, underside covered with whitish hairs. Fruit of 2 distinct carpels .. .. 6. *Callicoma.*

Fruit not splitting open (indehiscent).
- Leaves simple or consisting of 1 leaflet.
  - Fruit fleshy, inner hard part 2-celled .. .. 3. *Schizomeria.*
  - Fruit hard, 2-celled, surrounded at base by the enlarged calyx 4. *Ceratopetalum.*

1. GEISSOIS.

Geissois Benthami F.v.M. Red Carrabeen, Leather Jacket, Red Carrobean. Figs. 81 and 82.

Derivation.—Greek *geisson*, projecting part of the roof (alluding to overlapping seeds) ; Benthami, in honour of George Bentham.

Description.—A large tree attaining a height of 100 ft. and a stem diameter of 3 ft. Stem mostly buttressed at the base. Bark grey, sometimes slightly wrinkled and sprinkled with small pustules ; when cut, deep red to brown, paler towards sapwood. When the thin outermost layer of bark is removed it often exposes a surface with reddish streaks on a yellow background. Thickness of bark $\frac{9}{16}$ in. on a tree with

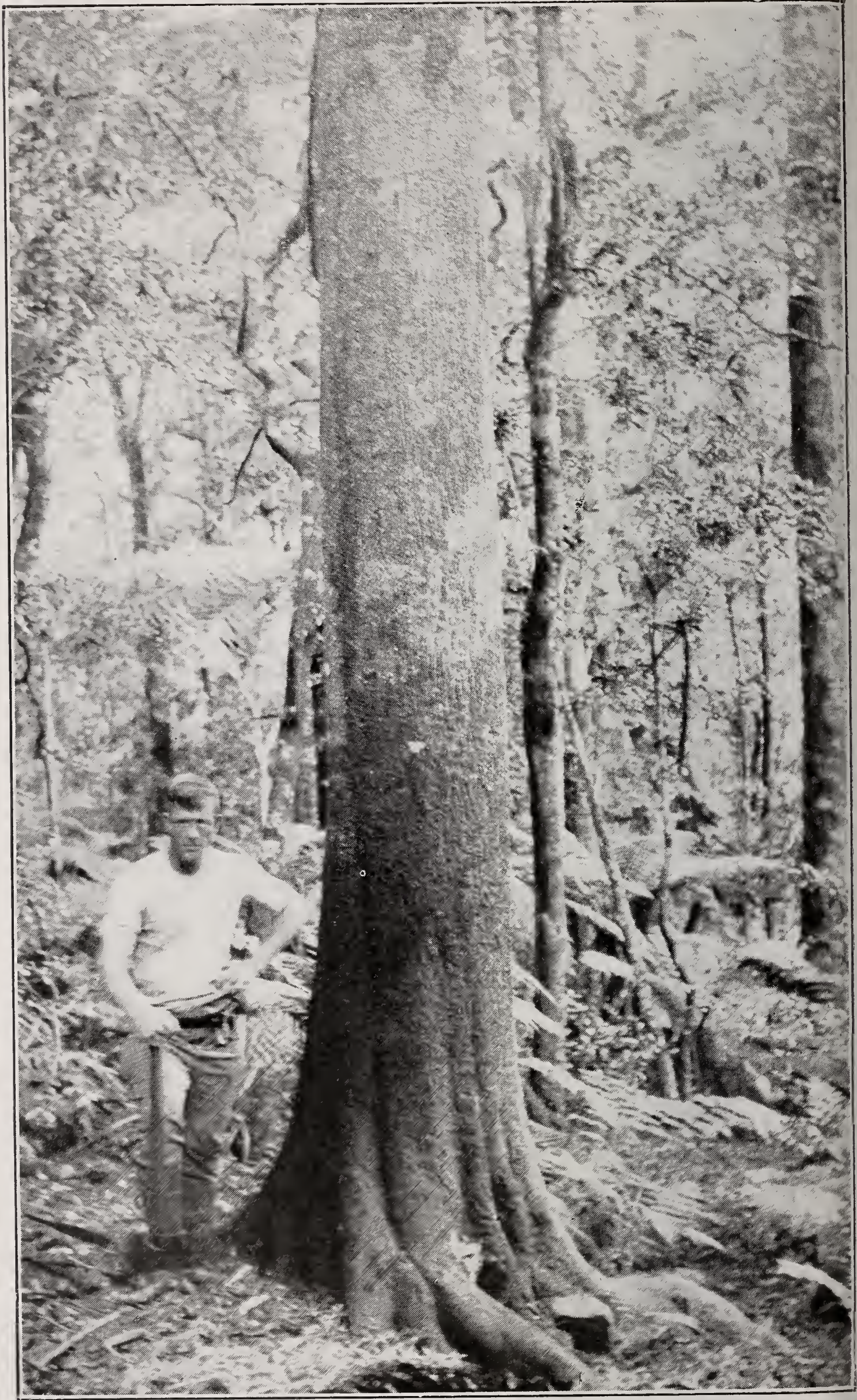


Fig. 79.—Opossum Wood (*Quintinia Sieberi*). Ranges east of Emu Vale, near Killarney, about 28.4° S. Tree ferns (*Dicksonia antarctica*) in background in lower part of picture.

(*Photo.: W. D. F.*)

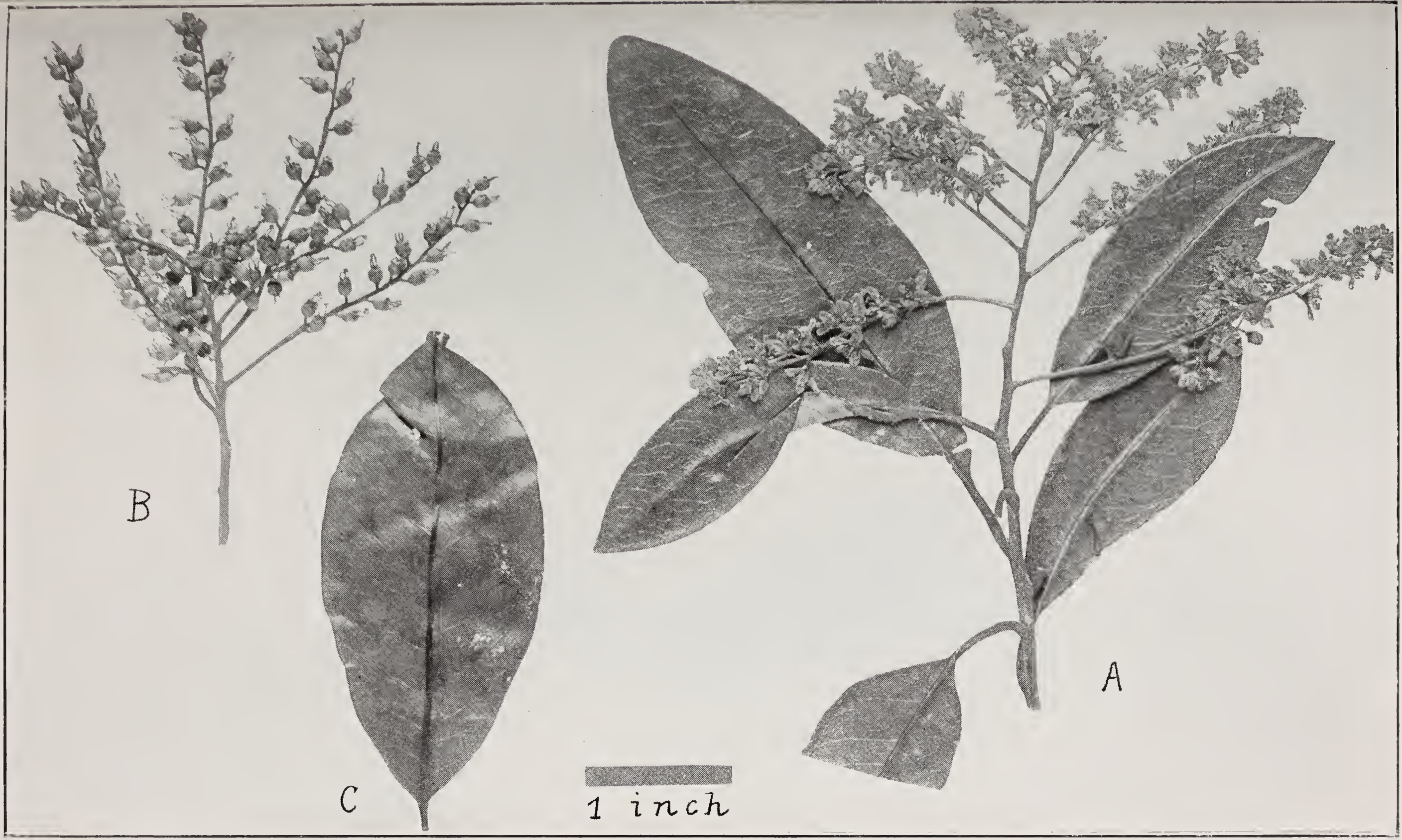


Fig. 80.—Opossum Wood (*Quintinia Sieberi*). A, flower-bearing branchlet; B, fruit-bearing branchlet; C, leaf, showing underside. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

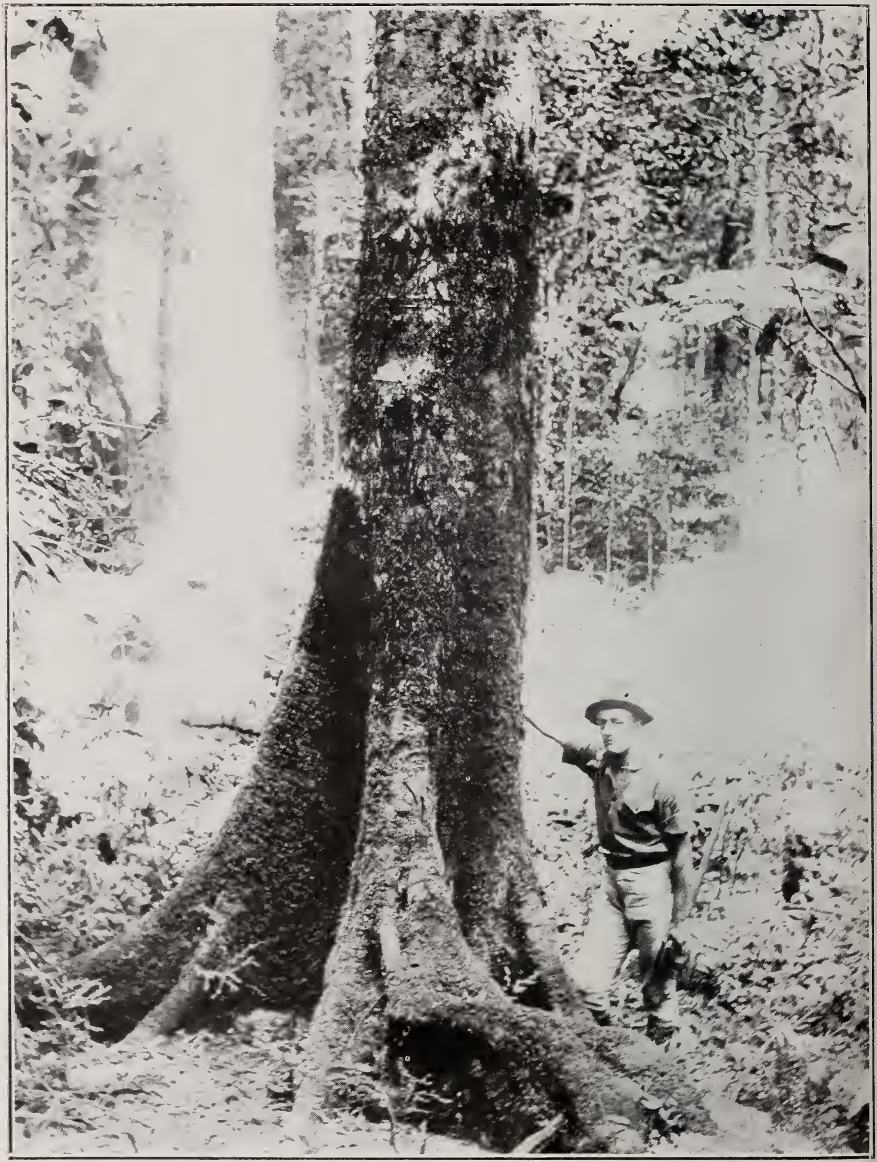


Fig. 81.—Red Carrabeen (*Geissois Benthami*). Ranges east of Emu Vale, near Killarney, about 28.4° S. The stem of the tree is covered to a great extent by epiphytes. The large broad leaves on upper right are of *Laportea gigas*.

(*Photo.: W. D. F.*)

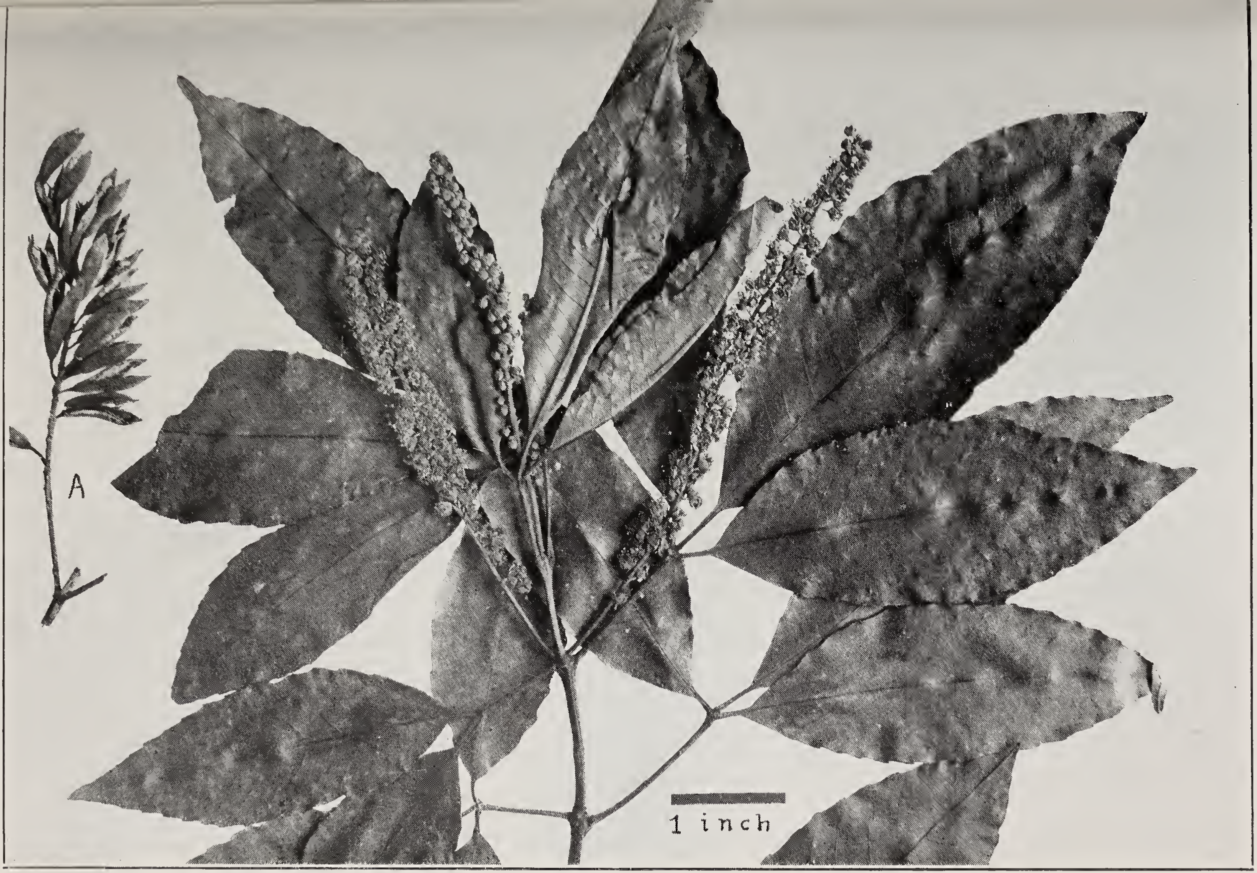


Fig. 82.—Red Carrabean (*Geissois Benthami*). Branchlet bearing flowers. A, capsule-bearing branchlet. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

a stem diameter of 2 ft. 6 in. Sapwood white. Leaves opposite, consisting of 3 leaflets. Common leaf-stalks ¾ to 2¼ in. long. The 3 leaflets are attached to the end of the common leaf-stalk by stalklets measuring 3/10–¾ in. long. Each leaflet has the appearance of an ordinary leaf, is egg-shaped or elliptical in outline, is toothed on the margins, and is mostly protracted into a blunt point at the apex ; the lateral nerves are visible especially on the underside, but the net-veins are not prominent ; measurement of blade of leaflet 3–7 in. long, 2⅓–3 times as long as broad. On the younger branchlets where the common leaf-stalk joins the branchlet there are a pair of rounded stipules varying from ½–1 in. in diameter. Flowers in slender racemes measuring from 3½–6 in. long. Stalklets of individual flowers about 1/12 in. long, finely downy. Flowers about ¼ in. long. The outer part of the flower, the calyx, finely downy, divided into 5 or 6 lobes about ⅛ in. long. There are no petals. On the inner side of the calyx are 20–30 bristle-like stamens about ¼ in. long. In the centre of the flower is the hairy, egg-shaped ovary surmounted by 2 slender styles. Fruiting capsule silky downy, almost cylindrical, ⅝–¾ in. long, 2-celled, the cells separating from the summit. Seeds several in each cell, flat, about ⅙ in. long.

Distribution.—Scrubs of Southern Queensland such as those of Macpherson Range, National Park, ranges about Killarney, Upper Tallebudgera Creek, and Tambourine Mountain. N. S. Wales as far south as the Manning River (J. H. Maiden).

Uses.—The timber should be useful for general indoor work.

References.—*Geissois Benthami* F.v.M., Docum. Intercol. Exhib. (No. 5, Australian Vegetation), 31, 1866 (name only) ; F.v.M., Fragmenta Phytographiae Australiae, vol. 5, p. 180, 1865-1866. *Weinmannia Benthami* F. M. Bailey, Queensland Flora, vol. 2, p. 541, 1900. The first reference is copied from J. H. Maiden's Forest Flora of N.S.W., vi., p. 206.

2. ACKAMA.

Ackama paniculata Engl. Rose-leaf Marara. The leaves resemble those of the rose ; the tree is closely allied to the Marara *Weinmannia lachnocarpa*. Corkwood is a common name in use in N. S. Wales. Rose Alder. Figs. 83 and 84.

Derivation.—Ackama from the Maori name *makamaka* for the New Zealand species *Ackama rosaefolia* ; paniculata refers to the branched (paniculate) inflorescence of the tree.

Description.—A tree attaining 130 ft. in height and a stem diameter of 3 ft. Stem often buttressed. Bark light or yellowish grey, often sprinkled with fine pustules, and the pustules often arranged in lines or longitudinal wrinkles ; when cut pale brown or pinkish red, paler inwards, measuring from ⅜–⅝ in. thick on trees with a stem diameter of 3 ft. Surface of sapwood white. Young shoots, young branchlets, and branches of the inflorescence finely hairy. Leaves opposite, pinnate, with 5 or sometimes 3 or 7 leaflets ; the leaflets are opposite to one another with the exception of the terminal odd one. Each leaflet has the appearance of an ordinary leaf, is borne on a stalklet 1/10–⅕ in. long and more than twice that length in the case of the terminal odd leaflet, is elliptical or lance-shaped in outline, mostly pointed at the apex, toothed on the margins ; the midrib, lateral nerves, and a few net-veins visible on both sides and sometimes there are minute tufts of hairs on the underside where the lateral nerves join the midrib ; measurement of leaflet blade, 2–4½ in. long, 2–3 times as long as broad. Flowers in very much branched inflorescences (panicles) in the forks of leaves towards the ends of branchlets. Individual flowers very small. The outer part of the flower, the calyx, divided almost to the base into 5 lobes, egg-shaped in outline, and measuring about 1/24 in. in length. On the inner side of the calyx and alternating with its lobes are 5 petals narrower and slightly longer than the calyx lobes. On the inner side of the petals are 10 slender stamens 1/12–⅛ in. long. The ovary, situated in the centre of the flower, is surrounded at the base by the disk, is egg-shaped, and covered with hairs and tapers into 2 slender styles almost as long as the stamens. Capsule egg-shaped or nearly globular, about 1/10 in. long, 2-celled with 1 or 2 seeds in each cell, the capsule opening from the top into 2 valves. Seeds minute, covered with a few long fine twisted hairs. Flowering period : November and December ; in fruit in January.

Distribution.—Coastal scrubs of Eastern Australia from Hawkesbury River, N.S.W. (C. Moore), to Eungella Range, west of Mackay, Queensland.

Uses.—The timber could be used for cabinet-making and general indoor work.

References.—*Ackama paniculata* Engler, Die Naturlichen Pflanzenfamilien, iii. Teil. 2 Abteilung a p. 99, 1890 ; *Ackama Muelleri* Bentham, Flora Australiensis, vol. ii., p. 444, 1864 ; *Weinmannia paniculata* F.v.M., Fragmenta Phytographiae Australiae, vol. ii., p. 83, 1860-1861 ; *Weinmannia paniculosa* F.v.M., loc. cit. p. 175.

3. SCHIZOMERIA.

Schizomeria ovata D. Don. White Cherry, Crab Apple. Tree exceeding 100 ft. in height and 5 ft. stem diameter in N. S. Wales (J. H. Maiden); much smaller in Queensland. Leaves opposite; stalks $\frac{1}{2}$–$\frac{5}{8}$ in.; blades elliptical, margins toothed; midrib, lateral nerves, and numerous net-veins visible on both surfaces; 3–6 in. long, $2\frac{1}{2}$–3 times as long as broad. Inflorescences situated on the branchlets between the uppermost pairs of leaves. Fruit egg-shaped, $\frac{5}{8}$ in. long, yellow or whitish, seated upon the small 5-lobed calyx, outer part fleshy, inner part hard and containing 2 small cells, each cell containing a seed.—Illawarra (Benth.) to Eungella Range (west of Mackay).

4. CERATOPETALUM.

Ceratopetalum apetalum D. Don. Coachwood. A tree attaining 70 ft. in height and 2 ft. stem diameter. Bark, when broken, fragrant, containing coumarin (J. H. Maiden). Leaves opposite; stalk $\frac{1}{2}$–$\frac{3}{4}$ in. The blade is attached to the stalk by a joint or articulation and therefore represents a leaflet. The blade is lance-shaped or elliptical, margins toothed; midrib, lateral nerves, and numerous net-veins visible on both surfaces; $2\frac{1}{2}$–5 in. long, 3–4 times as long as broad. Inflorescences springing from forks (axils) of upper leaves or between the upper leaves. The flowers consist of 5 or 4 calyx lobes surrounding 10 or 8 stamens inserted on a disk surrounding the base of the ovary. The ovary tapers at the apex into 2 styles. In the fruit the enlarged calyx lobes attain a length of $\frac{3}{8}$ in. The fruit, which is surrounded at the base by the calyx, is egg-shaped and about $\frac{1}{8}$ in. across; it contains 2 cells.—N. S. Wales from Milton to Queensland border (Maiden). Very common on parts of Dorrigo Highlands where almost pure stands of it occur (N. W. Jolly). A small-leaved variety (var. *microphyllum* Bailey and White) is found on the Macpherson Range, Queensland.

5. WEINMANNIA.

Weinmannia lachnocarpa F.v.M. Marara, Rose Marara. Figs. 1, 85, 86.

Derivation.—Weinmannia, in honour of John William Weinmann; lachnocarpa from Greek *lachnos* wool, *karpos* fruit (alluding to the densely hairy fruit).

Description.—A tree attaining a height of 130 ft. and a stem diameter of 3 ft. 6 in. Stem strongly buttressed at the base, the buttresses often very prominent and extending outwards for some distance. Bark brown or greyish, often slightly rough with small pustules and often somewhat scaly; when cut, dark reddish brown, $\frac{3}{16}$ in. thick on a tree with a stem diameter of 2 ft. 3 in. Sapwood white. Leaves opposite, consisting of 3 leaflets. Common leaf-stalk $\frac{1}{2}$–$1\frac{1}{2}$ in. long, bearing at its summit the 3 leaflets. Each leaflet has the appearance of an ordinary leaf, is elliptical in outline, is stalkless or nearly so, has toothed margins and a shortly pointed apex; the midrib, lateral nerves, and net-veins visible on both surfaces; measurement of leaflets $1\frac{3}{4}$–4 in. long, $2\frac{1}{3}$–3 times as long as broad. Flowers finely downy in slender racemes situated in the forks of the leaves or springing from the scars of fallen leaves, the racemes about 2 in. long. Stalks of individual flowers about $\frac{1}{6}$ in. long. Flowers about $\frac{1}{4}$ in. in diameter when expanded, the outer part, the calyx, consisting of 6 (rarely 5 or 7) nearly oval lobes about $\frac{1}{10}$ in. long. Petals none. On the inner side of the calyx and shorter than the calyx lobes are about 20 fine bristle-like stamens. The ovary in the centre of the flower is egg-shaped and hairy and tapers at its apex into 2 styles. The fruit consists of a woolly ball about $\frac{3}{8}$ in. in diameter seated on the calyx. Beneath the covering of hairs the fruit is egg-shaped and measures about $\frac{1}{6}$ in. long, is divided into 2 cells. Seeds several in each cell, almost egg-shaped, about $\frac{1}{16}$ in. long.

Distribution.—Common in scrubs of coastal Queensland from Tweed River on the south to Gympie on the north. Northern Rivers, N. S. Wales, as far south as Coff's Harbour (J. H. Maiden).

Uses.—The timber should be useful for general indoor purposes. It is often used in the bush for making handles for tools such as brush-hooks.

References.—*Weinmannia lachnocarpa* F.v.M., Fragmenta Phytographiae Australiae, vol. 8, p. 7, 1872–1874; *Geissois lachnocarpa* J. H. Maiden, Forest Flora of N. S. Wales, vol. 7, p. 6, 1922 (with figure).

Weinmannia rubifolia Benth. Tree 20 ft. high (J. H. Maiden). According to Maiden's figure (For. Fl. N.S.W. 6, 264) the species differs from *Weinmannia lachnocarpa* (*see* Fig. 86) in its hairy leaflets, longer inflorescences, and much less hairy capsules.—Hunter River, N.S.W., to Queensland border.

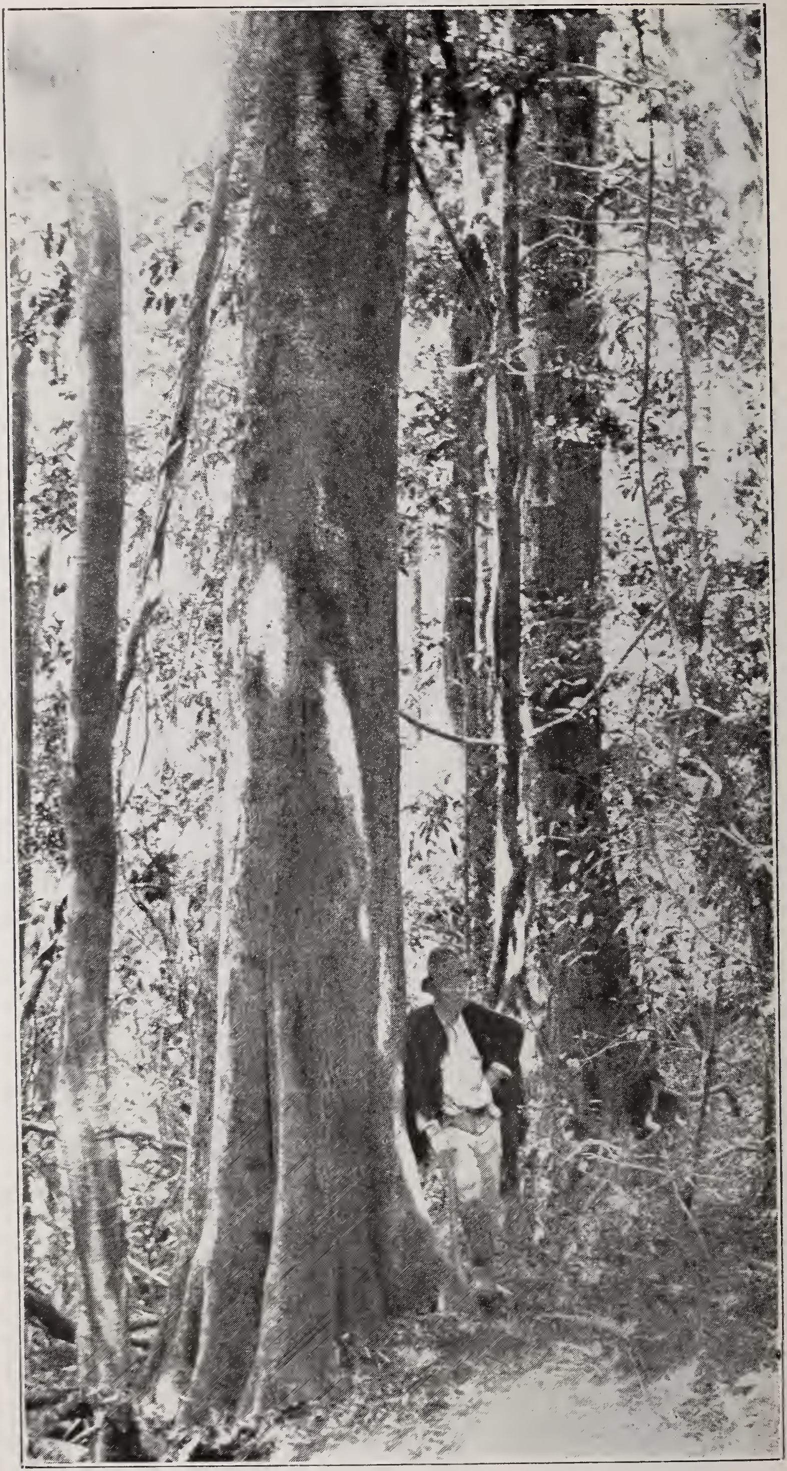


Fig 83.—The Rose-leaf Marara (*Ackama paniculata*). Roberts Plateau, Macpherson Range, about 28.3° S.

(*Photo.: W. D. F.*)

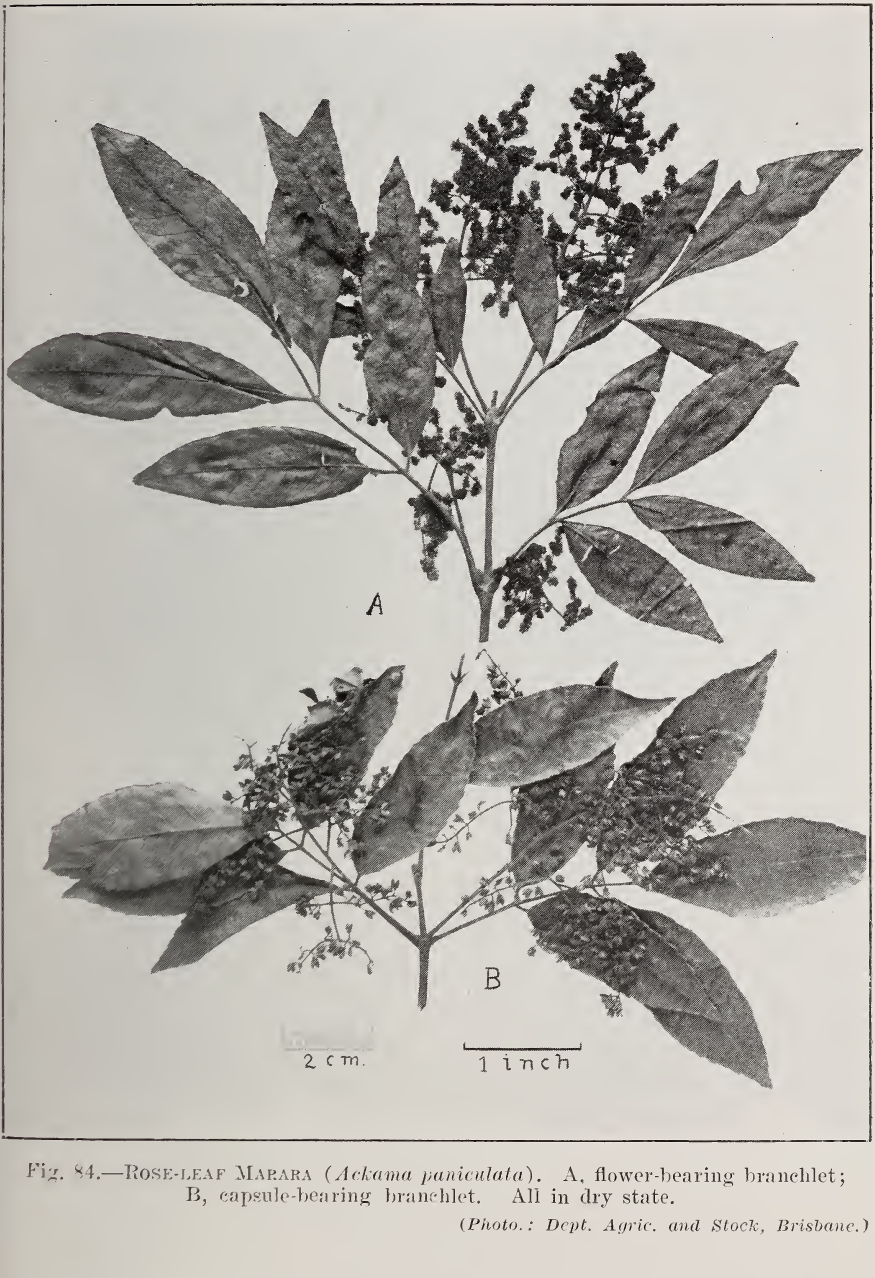


Fig. 84.—Rose-leaf Marara (*Ackama paniculata*). A, flower-bearing branchlet; B, capsule-bearing branchlet. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

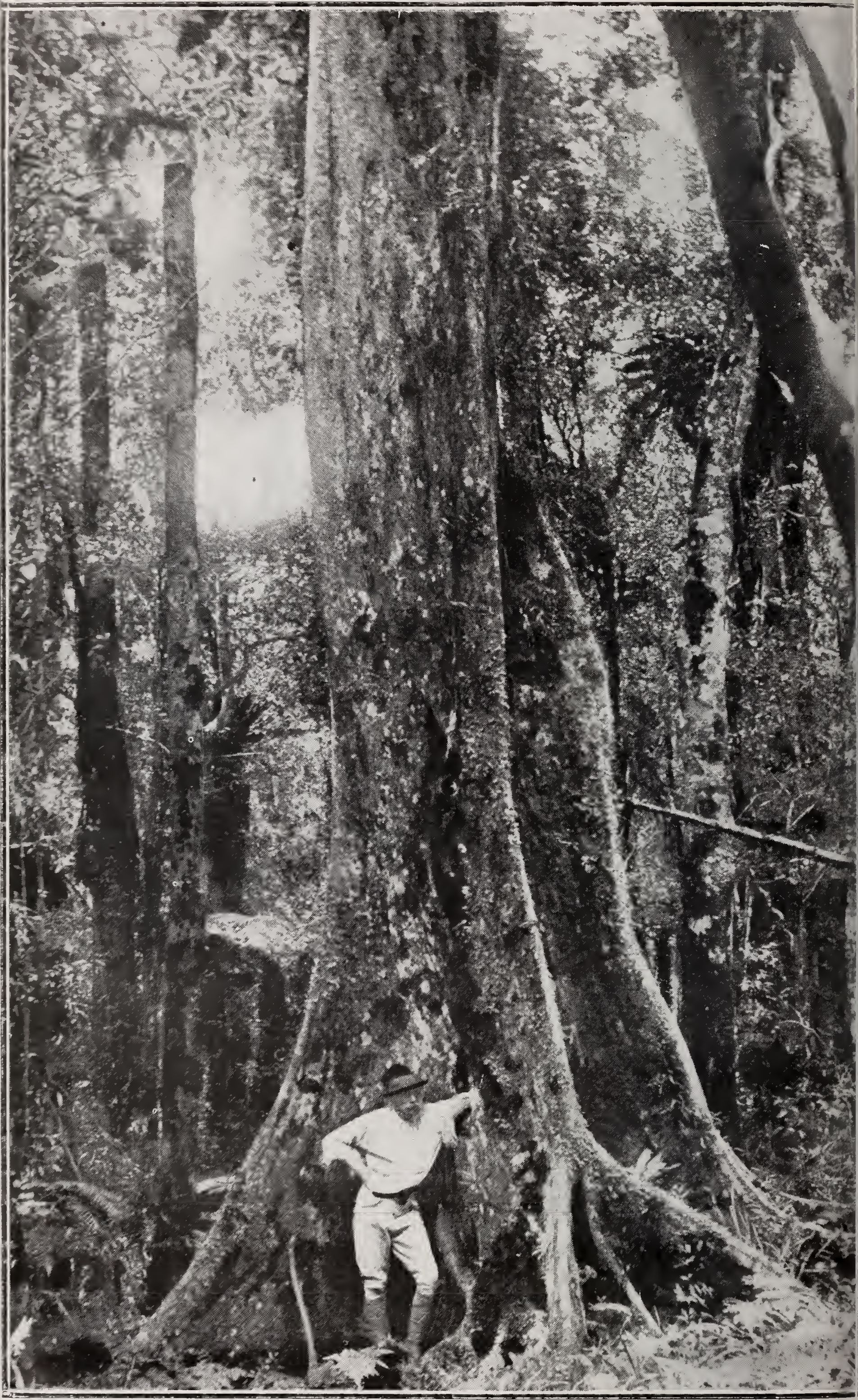


Fig. 85.—Marara (*Weinmannia lachnocarpa*). Roberts Plateau, Macpherson Range, about 28.3° S. See also Fig. 1.

(*Photo.: W. D. F.*)

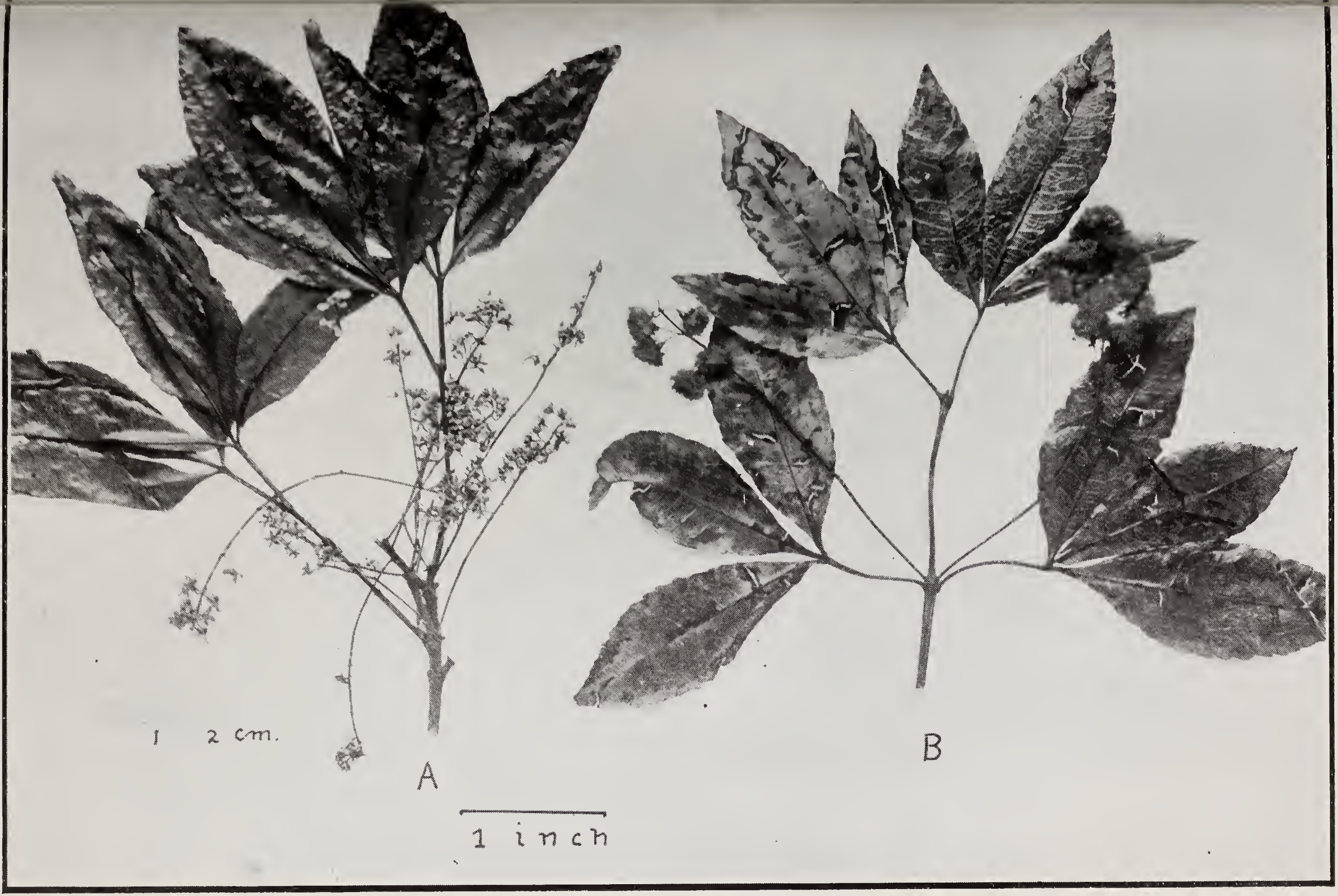


Fig. 86.—Marara (*Weinmannia lachnocarpa*). A, flower-bearing branchlet; B, fruit-bearing branchlet.
(*Photo.: Dept. Agric. and Stock, Brisbane.*)

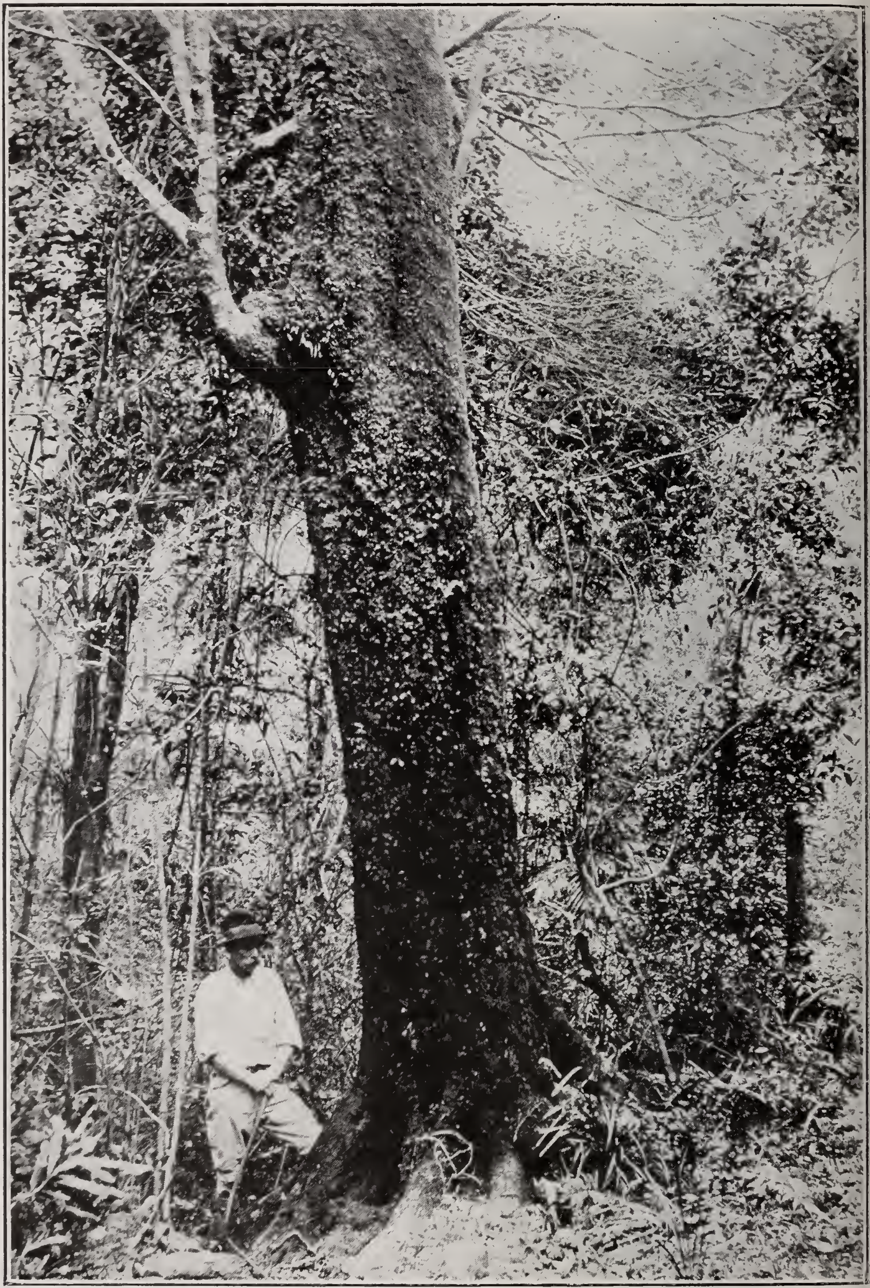


Fig. 87.—Callicoma serratifolia. Roberts Plateau, Macpherson Range, about 28.3° S. Altitude about 3,700 ft.

(*Photo.: W. D. F.*)

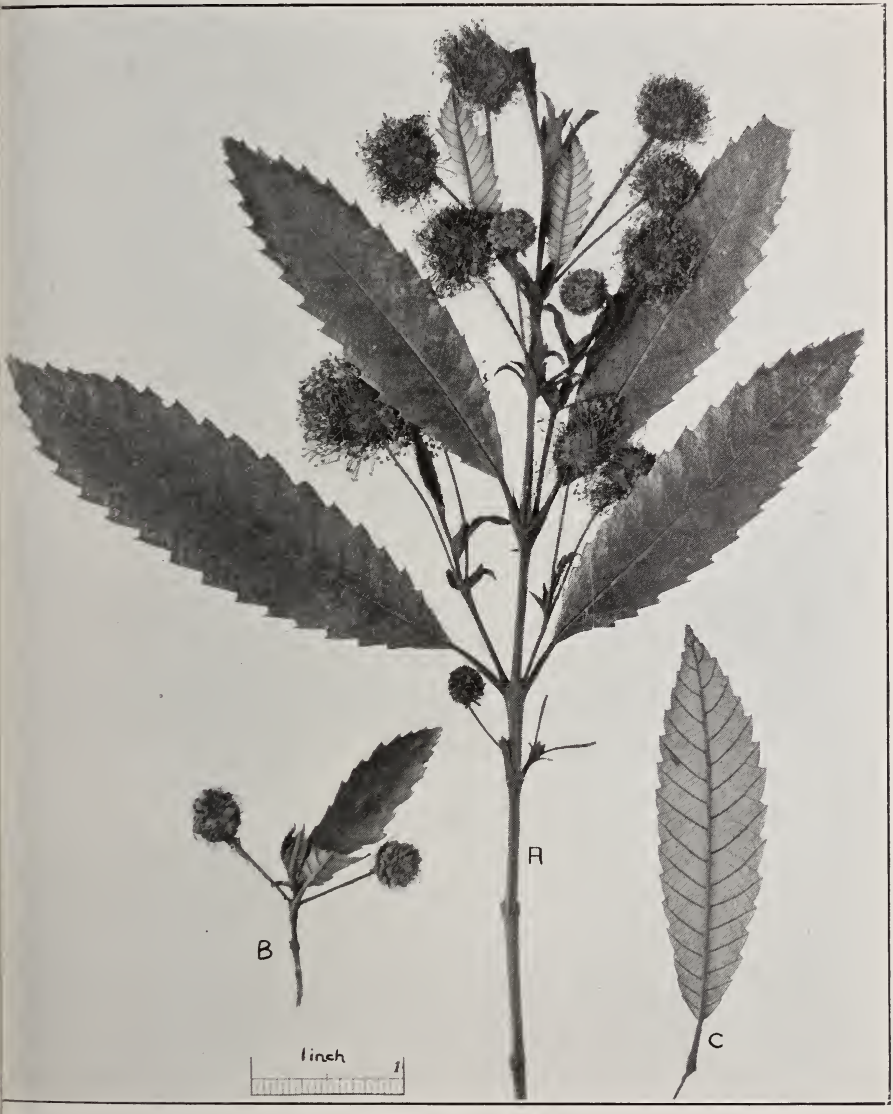


Fig. 88.—Callicoma serratifolia. A, inflorencence-bearing branchlet; B, fruit-bearing twig; C, leaf showing underside. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

6. CALLICOMA.

Callicoma serratifolia Andr. Figs. 87 and 88.

Derivation.—Callicoma from Greek *kalos* beautiful, *kome* the hair of the head (probably alluding to the pretty, fluff-like, globular heads of flowers) ; serratifolia from Latin *serratus* saw-shaped, *folium* a leaf, alluding to the toothed margins of the leaves.

Description.—A tree attaining a height of 40 ft. and a stem diameter of 2 ft. 4 in. Stem not buttressed at the base. Bark brown or dark brown, rather rough ; when cut, outer layer dark brown, inner layer pinkish brown, measuring $\frac{3}{8}$ in. thick on a tree with a stem diameter of 2 ft. 4 in. Surface of sapwood white. Young shoots, young branchlets, and inflorescence densely hairy with brown or rust-coloured hairs, the undersides of leaves covered with pale or white dense hairs. Leaf-stalks $\frac{1}{8}$–$\frac{1}{4}$ in. long. Leaves opposite, narrowly elliptical in outline, mostly pointed at the apex, upper surface hairless ; midrib and parallel, very regular, lateral nerves visible on both surfaces but much more conspicuous on the underside where they are raised and covered with brown hairs ; margins regularly toothed, the teeth closely resenbling in shape those of a saw ; measurement of leaf-blade, 2–5 in. long, 3–4 times as long as broad. At the bases of the leaf-stalks, inserted on the branchlets, are the stipules, 2 to each pair of leaves ; they measure about $\frac{1}{4}$ in. in length and soon fall away. Flowers in dense globular heads $\frac{1}{2}$–$\frac{3}{4}$ in. in diameter, the globular heads inserted on stalks $\frac{1}{2}$–1 in. long ; the stalks are situated in the forks of the younger leaves or at the ends of branchlets and are solitary, clustered, or several on a common stalk. The individual flowers in the heads are stalkless or nearly so. The outer part of the flower, the calyx, is divided almost to the base into 4 oval lobes about $\frac{1}{8}$ in. long. There are no petals in the flowers. On the inner side of the calyx lobes are 10 slender stamens $\frac{3}{8}$–$\frac{1}{2}$ in. long. The ovary, in the centre of the flower, consists of 2 narrowly oval carpels each tapering into a slender style about as long as the stamens. Fruit consisting of 2 hairy carpels about $\frac{1}{8}$ in. long, each opening along the inner edge. Seeds 1 or 2 in each carpel, minutely granulate, measuring about $\frac{1}{16}$ in. long. Flowering period : October.

Distribution.—Coastal scrubs of Eastern Australia from Sugarloaf Mountain, Clyde district, N.S.W. (Maiden and Campbell), to the Maroochy River, Southern Queensland. Common in the National Park, Macpherson Range.

Uses.—The timber does not appear to be used very extensively. It may be useful for indoor fittings.

Reference.—*Callicoma serratifolia* Andrews, Botanists' Repository, tablet 566.

Family LEGUMINOSAE.—Sub-family MIMOSOIDEAE.

Stamens united at the base in a tube enclosing the ovary .. 1. *Pithecolobium.*
Stamens free and not united in a tube at base .. .. .. 2. *Acacia.*

1. PITHECOLOBIUM.

Pithecolobium pruinosum Benth. Snow-wood, Tulip Siris. Shrub or small tree. Leaves alternate. The primary leaf-axis bears 1–3 pairs of secondary axes to which the leaflets are attached. Each secondary axis bears 5–11 leaflets. Stalklets of leaflets $\frac{1}{12}$ in. or less. Blades of leaflets lance-shaped, mostly very unequal-sided, apex rounded or more frequently drawn out into a blunt point, 1–3 in. long, 2–3 times as long as broad. Heads of flowers situated in the forks of the upper leaves, globose, 1–1$\frac{1}{4}$ in. diameter. Stalklets of each flower about $\frac{1}{8}$ in. long. Flowers $\frac{3}{8}$–$\frac{1}{2}$ in. long ; calyx bell-shaped, $\frac{1}{20}$ in. long, rim toothed. Corolla finely rusty hairy, $\frac{1}{6}$ in. long, nearly cylindrical, the 4–5 lobes at its rim $\frac{1}{24}$ in. long ; the numerous stamens project $\frac{1}{4}$ in. beyond the corolla rim. Pod very much twisted, flattened, $\frac{3}{8}$–$\frac{5}{8}$ in. wide.—Shoalhaven (Maiden) to Herberton, North Queensland.

Pithecolobium grandiflorum Benth. Lace-flower Tree. Attaining perhaps 50 ft. in height and 9 in. stem diameter, but flowering as shrub. Leaves alternate. The primary leaf-axis bears 2–3 pairs of secondary axes to which the leaflets are attached. The leaflets are arranged on each secondary axis in 2–4 pairs. Leaflet stalklets $\frac{1}{8}$–$\frac{1}{6}$ in. ; blades egg-shaped or lance-shaped in outline, drawn out into prominent point at apex, 1$\frac{1}{2}$–2$\frac{1}{2}$ in. long, 2–3 times as long as broad. Heads of flowers on stalks in upper leaf-forks or near ends of branchlets, 2$\frac{1}{2}$–3 in. across. Flowers stalkless in the heads. Calyx bell-shaped, $\frac{1}{4}$ in. long, rim obscurely toothed. Corolla $\frac{1}{2}$–$\frac{3}{4}$ in. long, rim divided into 4–5 lobes about $\frac{1}{4}$ in. long. The numerous crimson stamens project $\frac{3}{4}$–1 in. beyond the corolla. Pod spiral, flattened, about 1 in. wide.—Hastings River to Cape York (Benth.).

Pithecolobium Lovellae F. M. Bailey. Bacon-wood, Tulip Siris. Tree 20–30 ft. high (F. M. Bailey). Branchlets, leaf-stalks, underside of leaves, and inflorescence rusty hairy. Leaves alternate. The primary leaf-axis bears mostly 3 or 2 pairs of secondary axes to which the leaflets are attached. Leaflets 6–10 attached in pairs to each secondary axis. Stalklets of leaflets up to $\frac{1}{12}$ in. Leaflets egg-shaped or lance-shaped in outline, apex blunt or shortly and bluntly pointed, $1\frac{1}{4}$–$3\frac{1}{2}$ in. long, 2–$2\frac{1}{2}$ times as long as broad. Heads of flowers on stalks in upper leaf-forks (or arranged in a terminal inflorescence), on stalks 1–$1\frac{1}{2}$ in. long, the heads 2–$2\frac{1}{2}$ in. diameter. Flowers stalkless in the heads. Calyx bell-shaped, $\frac{1}{4}$ in. long, rim obscurely toothed. Corolla $\frac{1}{2}$–$\frac{5}{8}$ in. long, rim divided into 5 narrow lobes about $\frac{1}{4}$ in. long. The numerous stamens project $\frac{3}{4}$–1 in. beyond the corolla.—Tewantin to Fraser Island.

Pithecolobium Hendersonii F.v.M. A tree about 40 ft. high (F.v.M.). Leaves alternate. The primary leaf-axis bears mostly 1 pair of secondary axes to which the leaflets are attached. Stalklet of leaflets indistinct or up to $\frac{1}{20}$ in. Leaflets 2–6 to each secondary axis, arranged in pairs ; blades lance-shaped or egg-shaped in outline, very unequal-sided and mostly eared on one side at base, drawn out into a point at apex, 2–4 in. long, 2–3 times as long as broad. Heads of flowers $2\frac{1}{2}$ in. across, on stalks and often arranged in a terminal inflorescence. Each flower is almost stalkless in the head ; calyx cup-shaped or cylindrical and obscurely toothed at rim, $\frac{1}{8}$–$\frac{1}{4}$ in. long ; corolla cylindrical $\frac{3}{8}$–$\frac{5}{8}$ in. long with 4–5 triangular teeth at apex ; the numerous stamens project $\frac{1}{2}$–1 in. beyond the corolla. The pod is about $\frac{1}{2}$ in. in breadth, is thick and prominently indented between the seeds.—Richmond River (F.v.M.) to Innisfail, North Queensland.

Pithecolobium Muellerianum Maid. & Baker. Described by Maiden and Baker as a tree 50–70 ft. high and with stem diameter of 2 ft. Leaves alternate. The primary leaf-axis bears mostly only 1 pair of secondary axes or only 1 secondary axis ; 2–4 leaflets are attached to the secondary axis. Stalklets of leaflets $\frac{1}{12}$–$\frac{1}{8}$ in. Leaflets lance-shaped in outline, unequal-sided, apex blunt or drawn out into a short blunt point, narrowed at base, $1\frac{1}{2}$–4 in. long, 2–3 times as long as broad. Heads of flowers on long stalks in upper leaf-forks or arranged in an inflorescence at ends of branchlets. Flower-heads about $1\frac{1}{2}$ in. diameter ; flowers stalkless in the heads ; calyx bell-shaped or cup-shaped, $\frac{1}{8}$–$\frac{1}{6}$ in. long, the rim minutely toothed. Corolla about $\frac{1}{4}$ in. long, with about 5 lobes at rim. The numerous stamens project about $\frac{1}{2}$ in. beyond the corolla. Pod thick, $\frac{3}{8}$–$\frac{5}{8}$ in. across, twisting when dry.—Richmond and Brunswick Rivers, where it is sometimes known as "Ash."

Acacia Bakeri J. H. Maid. Marblewood, Scrub Wattle, White Marblewood. Figs. 89 and 90.

Derivation.—Acacia may be derived from the Greek *Akantha*, a thorn or prickle (alluding to the spines of many African and Asiatic species) ; Bakeri, after Richard Thomas Baker.

Description.—A large scrub tree attaining a height of about 120 ft. and a stem diameter of nearly 3 ft. Stem not prominently flanged at the base. Bark brown, somewhat wrinkled, bright reddish brown when cut, measuring $\frac{5}{8}$ in. thick on a tree with a stem diameter of about 2 ft. All parts of the tree except the calyx and petals of its flowers appear to be hairless. Branchlets often flattened. Phyllodes (leaf-like organs which perform the functions of leaves), very shortly stalked, lance-shaped or elliptical in outline, often unequal-sided, generally with 3 main nerves traversing the length of the phyllode and with numerous fine net-veins between them ; measurement of phyllode, 2–4 in. long, 2–$3\frac{1}{2}$ times as long as broad. Flowers minute, in dense globular heads measuring about $\frac{1}{5}$ in. in diameter, the heads on slender stalks from $\frac{1}{4}$–$\frac{1}{2}$ in. long, arranged in racemes mostly springing from the forks of the phyllodes, the racemes sometimes longer than the phyllodes. There are 10–20 flowers in each globular head. Each flower consists of 4 or sometimes 5 calyx lobes which are nearly half the length of the petals and are, like the petals, finely downy on the outside. On the inner side of the calyx lobes are 4 or sometimes 5 petals which are egg-shaped in outline and measure nearly $\frac{1}{16}$ in. in length. On the inner side of the petals and longer than them are numerous (over 20) fine bristle-like stamens. The ovary, in the centre of the flower, is hairless, narrowly egg-shaped, and bears at its summit a bristle like style thicker than the stamens. Pod flat, attaining about 8 in. in length and about $\frac{1}{2}$ in. in breadth, narrower between the seeds. Seeds flat and shining, broadly oval, $\frac{1}{4}$–$\frac{3}{8}$ in. long.

Distribution.—Coastal scrubs of Queensland from the border of N. S. Wales to Pialba, north-east from Maryborough ; N. S. Wales, Mullumbimby (J. H. Maiden).

Uses.—The timber should be serviceable for general indoor fittings and cabinet-making.

Reference.—*Acacia Bakeri* J. H. Maiden, Proceedings of Linnean Society N. S. Wales, vol. 10, p. 337, 1895 (with figure).

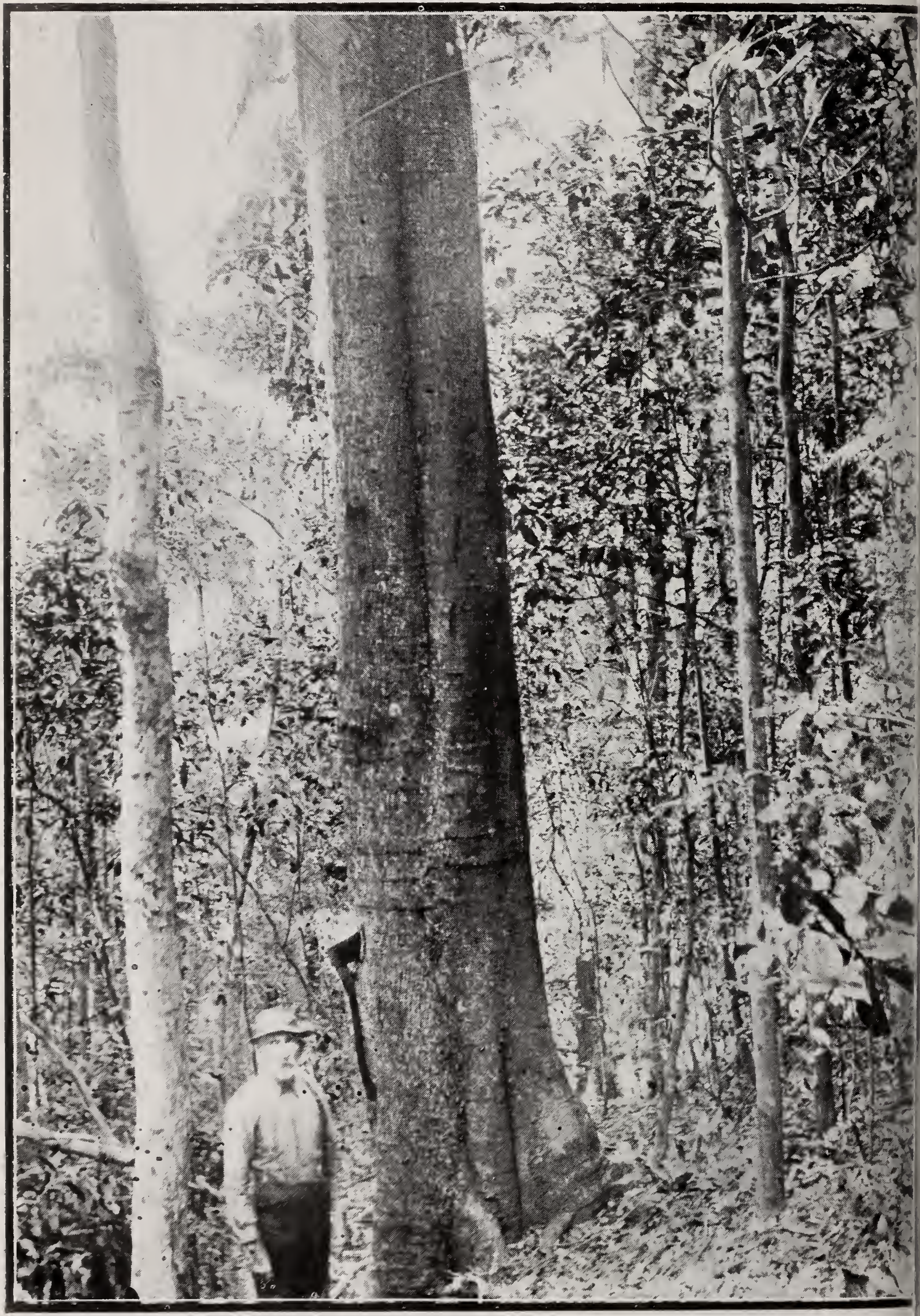


Fig. 89.—Marblewood (*Acacia Bakeri*). Kin Kin, about 26.2° S.

(*Photo.: W. D. F.*)

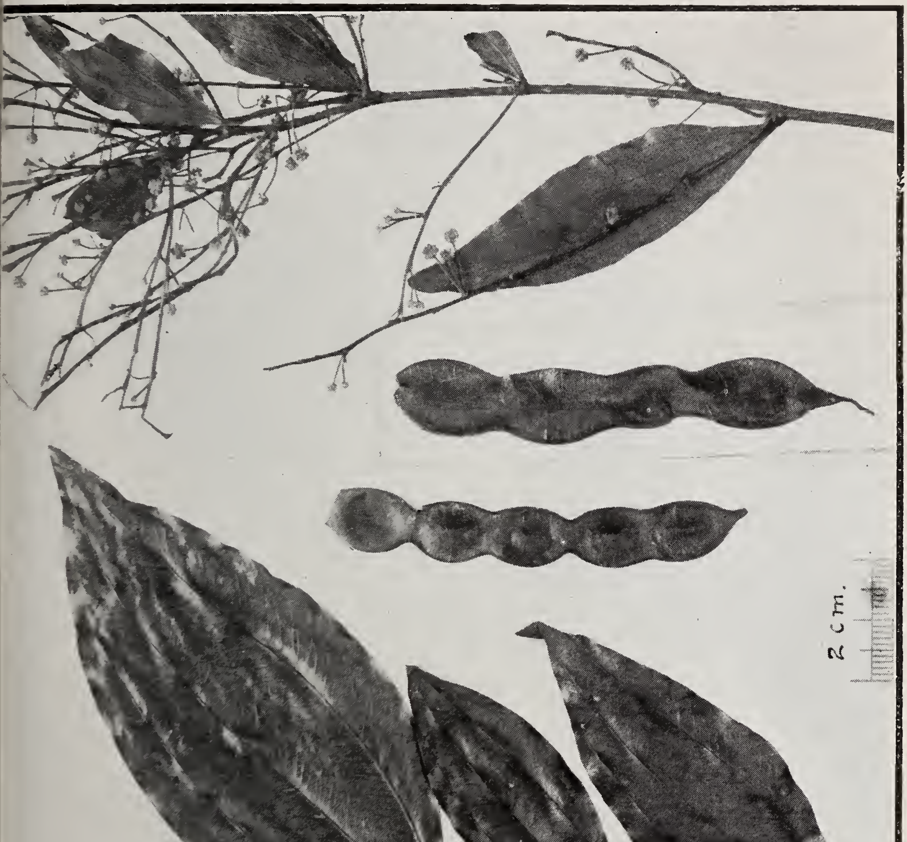


Fig. 90.—Marblewood (*Acacia Bakeri*). Dry; flower-bearing branchlet on right. Two pods are shown in the picture. All in dry state.
(Photo.: Dept. Agric. and Stock, Brisbane.)

Acacia melanoxylon R.Br. Blackwood. Attaining 80 ft. in height and 3 ft. stem diameter in mountain districts of Southern N. S. Wales (J. H. Maiden). Wood dark or brown, ornamental and excellent for cabinet-making. Young branchlets often angular. Leaf-like phyllodes alternate, reversed lance-shaped or sickle-shaped, gradually narrowed at base, bluntly pointed or tapering at apex, finely veined longitudinally, 3–5 longitudinal nerves more prominent than the remainder, net-veins few, 3–5 in. long, 5–10 times as long as broad. Flowers in globular heads about $\frac{3}{10}$ in. in diameter, arranged in short racemes up to $1\frac{1}{2}$ in. long, situated in forks of leaves. Pods elongated, much twisted, up to $\frac{3}{10}$ in. broad. Seeds black, oval, flattened, up to $\frac{1}{5}$ in. long, encircled more or less by the double fold of the reddish funicle.—N. S. Wales, Victoria, Tasmania

Acacia fasciculifera F.v.M. "Scaly Bark." Up to 50 ft. high and 2 ft. stem diameter. Bark scaly. Wood red and fairly durable. Branchlets round, very young ones often angular. Leaf-like phyllodes alternate. Stalks $\frac{1}{10}$ in. or indistinct. Blades of phyllodes straight or often sickle-shaped, narrowed towards base and apex, with a prominent longitudinal nerve and numerous fine veins branching from it, 3–6 in. long, 7–15 times as long as broad. Flowers in globose heads about $\frac{1}{4}$ in. diameter; the heads on stalks $\frac{1}{2}$–1 in. long; stalks in groups of 1–6 in leaf-forks. Pods flat, 2–6 in. long, $\frac{3}{8}$–$\frac{3}{4}$ in. broad, margins straight or indented between the seeds.—Rockhampton to Rosewood, south-west of Brisbane; Taroom, 180 miles inland. In dry scrubs.

Family LEGUMINOSAE.—Sub-family CAESALPINIOIDEAE.

Cassia Brewsteri F.v.M. Small tree or sometimes a large tree 4 ft. in stem diameter (F. Kajewski). Leaves alternate, pinnate, consisting of several leaflets (which have the appearance of ordinary leaves) placed on a leaf-axis. Pod 8–17 in. long, flat or cylindrical, $\frac{1}{2}$–1 in. broad, marked by more or less distinct transverse ribs.—Drier scrubs, Northern N. S. Wales (Moore), to Bloomfield River, North Queensland.

Family LEGUMINOSAE.—Sub-family PAPILIONATAE.

Leaves simple or consisting of 1 broadly heart-shaped leaflet .. 1. *Barklya.*
Leaves consisting of 8–17 leaflets. Pod large .. .. .. 2. *Castanospermum.*
Leaves consisting of 3 leaflets. Branches prickly .. .. 3. *Erythrina.*

1. BARKLYA.

Barklya syringifolia F.v.M. A tree up to 60 ft. in height. Bark grey or dark grey, longitudinally wrinkled, red when cut. Leaves alternate; stalks $1\frac{1}{4}$–$2\frac{1}{2}$ in. long; blades broadly heart-shaped in outline, very broad at base, shortly tapering or drawn out into a blunt point at apex, 3 nerves on each side of midrib arising from base, 2–$3\frac{1}{2}$ in. long, about as long as broad at the base. Flowers in large inflorescences chiefly at ends of branchlets, inflorescence branches consisting of narrow racemes of crowded, small, orange flowers $\frac{3}{8}$–$\frac{1}{2}$ in. long. Flower-stalks $\frac{1}{10}$ in.; calyx cup-shaped, $\frac{1}{10}$ in. long, rim minutely toothed; petals protruding $\frac{1}{10}$–$\frac{1}{8}$ in. beyond calyx rim, 10 stamens protruding $\frac{1}{4}$ in. beyond calyx rim.—Richmond River, N. S. Wales, to Mackay, Queensland.

2. CASTANOSPERMUM.

Castanospermum australe A. Cunn. Black Bean, Bean tree, Moreton Bay Chestnut. Figs. 91 and 92.

Derivation.—Castanospermum from Greek *castanon*, the Chestnut tree; *sperma*, a seed (alluding probably to the resemblance of the seed to the chestnut); *australe* Latin, southern.

Description.—A large tree attaining 130 ft. in height and a stem diameter of 4 ft. Stem not prominently buttressed. Bark varying from grey to brown in colour, slightly rough with very small pustules, when cut yellow and measuring $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. The inner bark and green branchlets when crushed have a peculiar odour similar to that associated with a freshly cut pumpkin. In most of the trees, especially the smaller ones, the yellow sapwood is very thick and surrounds the dark-brown or almost black heartwood. Very young shoots covered with rust-coloured hairs. Leaves dark green, alternate, pinnate, consisting of 8–17 leaflets. Each leaflet has the appearance of an ordinary leaf, and is borne on a short stalklet about $\frac{1}{6}$ in. long. The leaflet blade is narrowly oval or narrowly elliptical in outline, somewhat rounded but often unequal-sided at base, bluntly pointed at the apex, upper surface very glossy; midrib, lateral nerves, and exceedingly numerous very minute net-veins visible on both surfaces; measurement of leaflet blade, 2–6 in. long, 2–3 times as long as broad. The flowers are arranged in inflorescences (racemes) 3–6 in. long, the racemes arising from the scars of fallen leaves. Each flower is yellowish red in colour and is comparable with a pea-flower in form. Stalklets of flowers about 1 in. long. Each flower is almost 1½ in. long. The lowermost part of the flower is the calyx, which is about ½ in. long; it is bell-shaped and has 5 obscure teeth at its rim. On the inner side of the calyx are the petals, which are mostly over 1 in. long. The uppermost petal, the standard, is the broadest; it is reflexed and notched in the upper part. The other petals consist of 2 wing petals and 2 keel petals; they are similar in shape. On the inner side of the petals are the stamens, 10 in number, free from one another, all curved in the upper part and measuring about as long as the petals. In the centre of the flower is the bean-shaped ovary which tapers at each end. The pod or "bean" is hard and heavy, 2-valved, 7–10 in. long, about 2 in. broad, and contains 3–5 round or compressed seeds about 1½ in. diameter. Seed-coat brown. Flowering period: October and November.

Distribution.—Coastal scrubs from Bellinger River, N.S.W. (J. H. Maiden), to Cape York Peninsula, Queensland, and as far inland as the Bunya Mountains (about 100 miles from the coast).

Uses.—The timber is dark brown, attractively figured and hard. It has a magnificent appearance and must be conceded to be one of the most attractive cabinet woods of Australia or, perhaps, of the world. The timber should be seasoned for a number of years as it is liable to warp and shrink. Pores of wood single or in pairs, surrounded by patches of soft tissue which are often extended in a tangential direction, and sometimes by lateral union form more or less continuous tangential lines.

Poisonous Properties.—The seeds and leaves are reputed to be poisonous to stock. J. C. Brunnich, Queensland Agricultural Chemist, found the seeds to contain 14 per cent. of saponin (calculated upon the air-dried flour); *see* Queensland Agricultural Journal, vol. 9, p. 421, 1901. Greshoff found saponin in the leaves but could not detect it in the seeds (*see* Kew Bulletin, p. 405, 1909).

Reference.—*Castanospermum australe* A. Cunningham in Hooker's Botanical Miscellany, vol. 1, p. 241, plates 51 and 52, 1830.

3. ERYTHRINA.

Erythrina vespertilio Benth. Bat's-wing Coral tree. The resemblance of the leaflets to the form of a bat with extended wings evidently suggested the common name. It is also known as Cork tree, probably on account of its rough bark like that of the Cork Oak (*Quercus suber*). Grey Corkwood. Figs. 93 and 94.

Derivation.—Erythrina from Greek *erythros*, red, referring to the red colour of the flowers; *vespertilio* Latin, a bat, referring to the shape of the leaflets which resemble the form of a bat with wings extended.

Description.—A tree attaining in the scrubs a height of 100 ft. and a stem diameter of 2 ft. 8 in.; in the open forest country it is mostly much smaller with a shorter stem and a spreading head of foliage. Stem not prominently flanged, in the smaller trees armed with conical prickles. Bark not scaly but rough and uneven, greyish brown; when cut very green near surface, cream-coloured towards sapwood, measuring ⅜–¾ in. thick on a tree with a stem diameter of 2 ft. 8 in. Branches, branchlets, and sometimes the stalks of leaves and the stalklets of leaflets armed with prickles. All parts hairless. Leaves alternate, pinnate, consisting of 3 leaflets. The main or common stalk of the leaves measures 2–4 in. in length; the stalklets of the lateral leaflets measure ⅛–¼ in. and the stalklets of the terminal odd leaflet ½–1½ in. Leaflets 3-lobed, the lateral lobes rounded at the apex and often curved outwards; the middle lobe is more pointed and mostly shorter than the lateral ones and is sometimes absent; measurement of leaflets, 1½–4 in. between the tips of the lateral lobes. Flowering branches (racemes) in the forks of leaves or at the ends of branchlets, sometimes 9 in. long. Flowers bright red, curved, about 1½ in. long. The lowermost part of the flower, the calyx, is bell-shaped, about ½ in. long, toothed at the rim and slit open towards the base on one side. On the inner side of the calyx are the 5 petals, very irregular in size and shape. The longest petal, the standard, is the most conspicuous part of the flower, is strongly curved, and measures over 1 in. in length; the other petals, the 2 wing petals, 1 on each side, measure about ⅜ in. long, the 2 keel petals below them measure about ½ in. long. On the inner side of the petals are the 10 stamens united in a narrow tube at the base and measuring about 1½ in. in length; the anthers, borne at the top of the stamens, measuring about ⅛ in. long. The ovary, in the centre of the flower and enclosed in the staminal tube, is slender and downy and tapers into a slender style; the ovary and style together measure about 1½ in. long. Pods tapering at both ends, containing 1, 2, or 3 seeds, often contracted between the seeds, measuring 2½–3½ in. long and about ⅜ in. broad. Seeds red or yellow, glossy, oval, about ⅓ in. long.

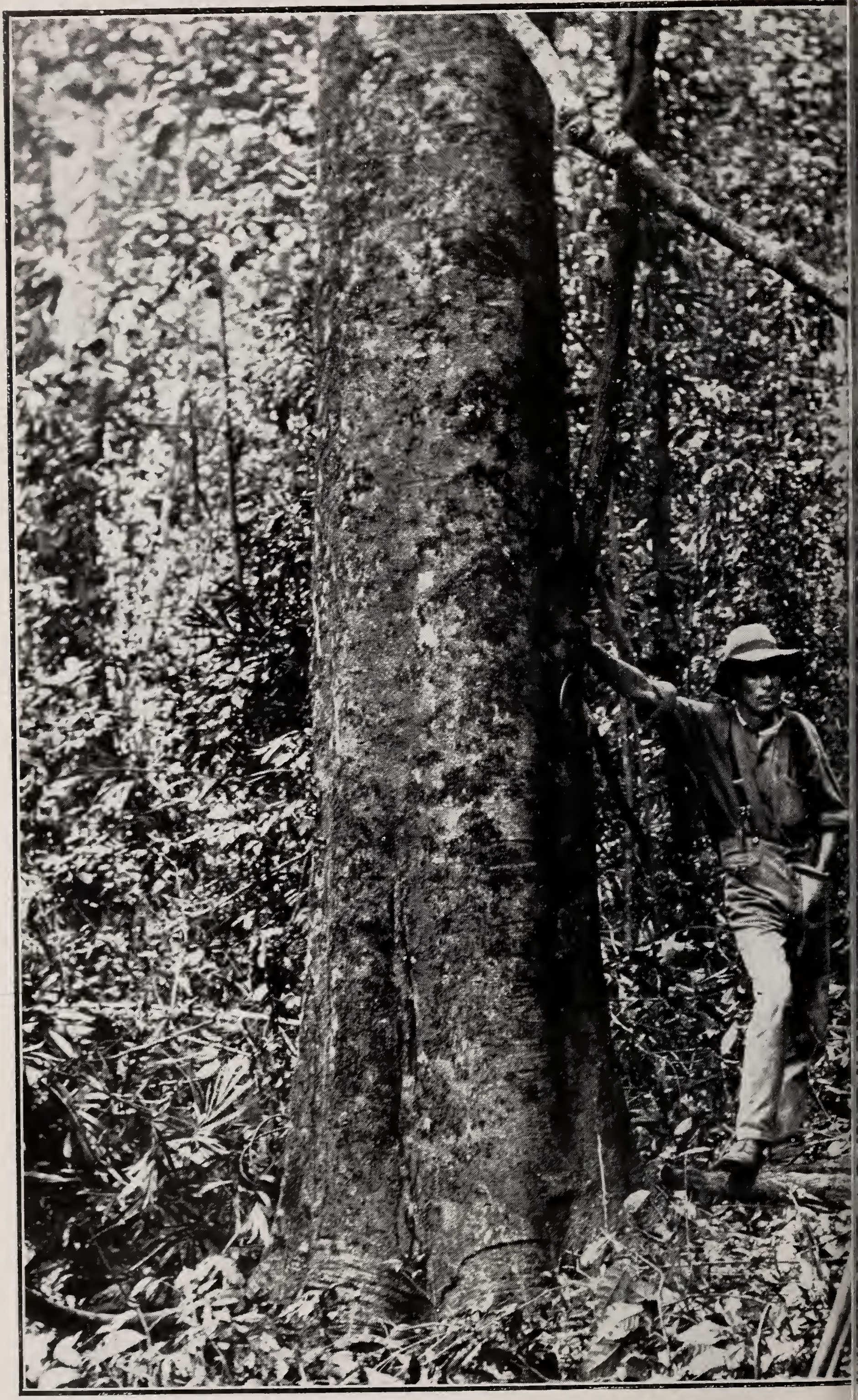


Fig. 91.—Black Bean (*Castanospermum australe*). Kin Kin, about 26.2° S.
(*Photo.: W. D. F.*

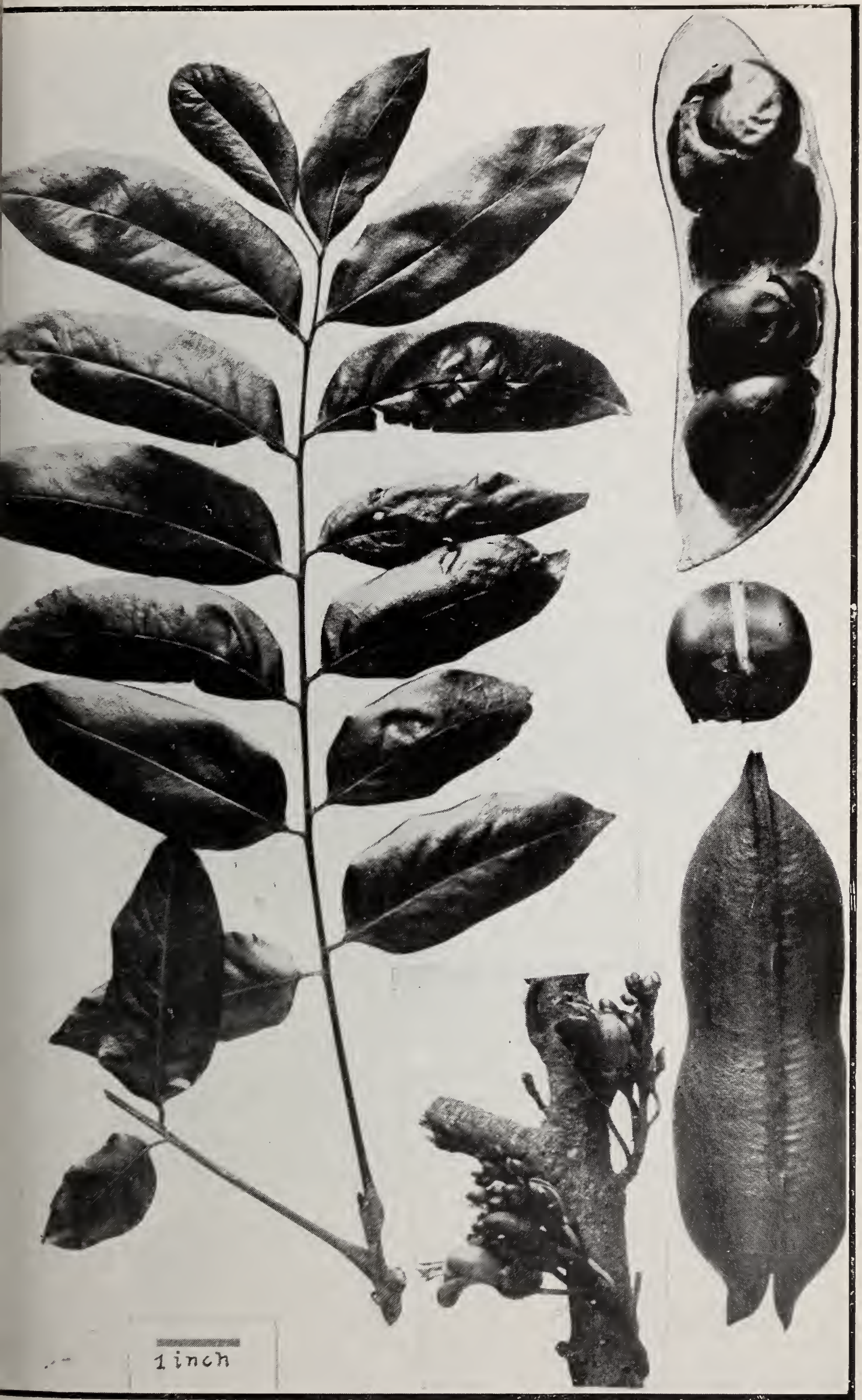


Fig. 92.—Black Bean (*Castanospermum australe*). Pod opened, showing seeds on upper ight; below it a seed. Pod on lower right; to the left of it part of an inflorescence-bearing ranchlet. The inch scale applies to all of the figures.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

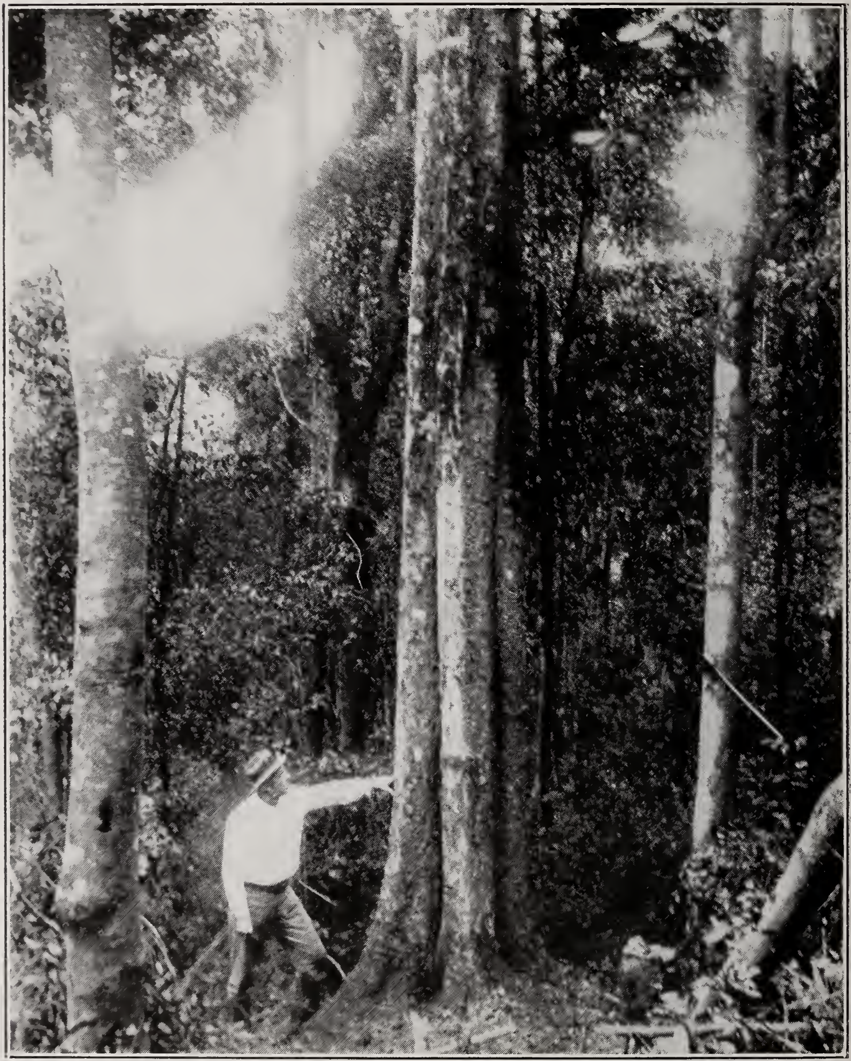


Fig. 93.—Bat's Wing Coral Tree (*Erythrina vespertilio*). Imbil, about 26.4° S. The raised, often oblique, ridges of the bark are shown in the lower part of the picture.

(*Photo.: W. D. F.*)

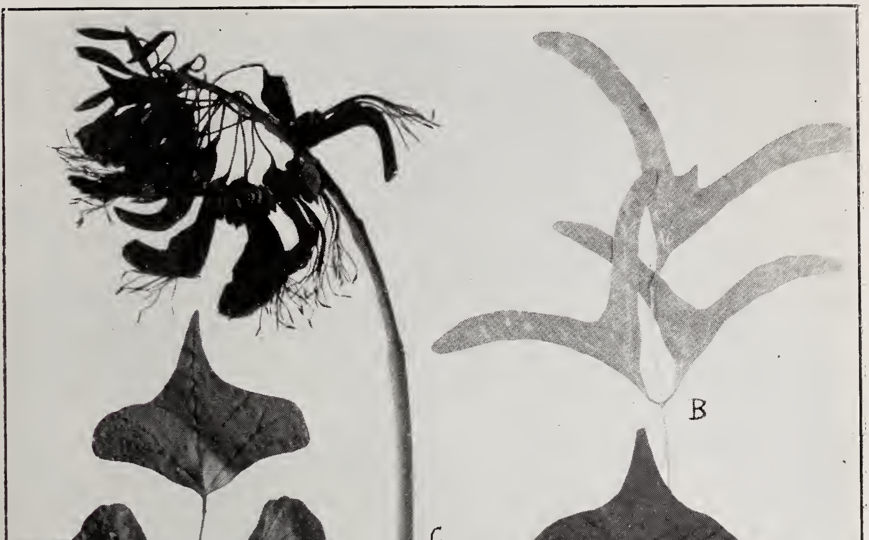


Fig. 94.—Bat's Wing Coral Tree (*Erythrina vespertilio*). A, leaves; B, leaf of the inland form; C, dried inflorescence; D, pod; E, seed. All dry material.

(Photo.: Dept. Agric. and Stock, Brisbane.)

Distribution.—Common in the drier scrubs and in the open forest country both on the coast and inland, from the Clarence River, N.S.W. (C. Moore), to Cape York Peninsula, Queensland. The following North Australian localities are recorded in the Flora Australiensis: Gulf of Carpentaria, Upper Victoria River, and towards Central Australia.

Uses.—The timber may be useful for some purposes in which lightness is a requisite.

Reference.—*Erythrina vespertilio* Bentham in Mitchell's Tropical Australia, p. 218, 1848.

Family RUTACEAE.

Fruit consisting of 1–5 almost free or partly united carpels which split open when dry. Carpels of *Pleiccocca* up to 9, succulent and scarcely splitting.

  Leaves opposite, consisting of 2–7 leaflets. Petals mostly 5; stamens 10 .. .. 1. *Bosistoa.*

  Leaves opposite, with 1 leaflet. Flowers mostly 4-merous. Fruit white and fleshy, composed of 5–9 carpels united at inner angle .. .. 2. *Pleiococca.*

  Leaves alternate, consisting of 5–13 leaflets. Leaf axis and stem prickly .. .. 3. *Zanthoxylum.*

  Leaves alternate, simple. Fruit consisting of 1–5 carpels .. 4. *Geijera.*

  Leaves opposite, consisting of 3 leaflets. Stamens 4 or 5 .. 5. *Evodia.*

  Leaves opposite, consisting of 3 or 1 leaflet. Stamens 8 or 10 6. *Melicope.*

  Leaves alternate, consisting of 7–15 leaflets. Carpels (often reduced to 1) prominently winged .. .. 7. *Pentaceras.*

  Leaves opposite, of 1 leaflet. Flowers ¾ in. long. Sepals and petals 4; stamens 8 .. .. 8. *Medicosma.*

  Leaves opposite, simple or consisting of 3–1 leaflets. Stamens 10 9. *Pagetia.*

Fruit splitting into 5 large, woody, more or less tuberculate, boat-shaped valves.

  Stamens mostly 5, often alternating with 5 staminodia.. .. 10. *Flindersia.*

Fruit indehiscent, more or less fleshy or hard.

  Leaves opposite, consisting of 1 or sometimes 3 leaflets. Stamens mostly 8. Fruit mostly 4-celled .. .. 11. *Acronychia.*

  Leaves alternate, simple. Stamens mostly 10. Fruit oval, bluish-black or red .. .. 12. *Halfordia.*

  Leaves alternate, consisting of 7–9 leaflets. Stamens mostly 10 13. *Micromelum.*

  Leaves alternate, consisting of 1 leaflet. Spines often in leaf-forks. Fruit elongate or globose and resembling a small lemon .. .. 14. *Citrus.*

1. BOSISTOA.

Bosistoa sapindiformis F.v.M. Tree up to 40 ft. high and 6 in. stem diameter. Leaves opposite, consisting of 3–7 leaflets; leaflets 4–5½ in. long, 3–4 times as long as broad, margins generally entire, venation prominent on both surfaces. Young leaves brilliant red. Fruit consisting of 1 oblique carpel (coccus) splitting open at apex and sides, surface strongly wrinkled, yellowish brown, hairy. Seed 1 in each fruit, globose or somewhat flattened, ⅝ in. diameter with brown seed-coat. Wood very tough.—Clarence River (Benth.) to Mackay.

Bosistoa transversa Bailey and White. Tree up to 50 ft. in height and 8 in. stem diameter. Leaves opposite, of 3 leaflets similar in texture and venation to those of foregoing species: leaflet blades 2½–4 in. long, 2–3 times as long as broad. Mature fruit consisting of 1 or 2 oblique carpels (cocci), ⅜–½ in. long, outer surface yellowish brown, hairy and ribbed or wrinkled, splitting open at apex and sides. Seeds 1 in each carpel, globose or somewhat flattened, ¼–⅜ in broad.—Queensland: Eumundi to Maryborough.

Bosistoa euodiformis F.v.M. Small tree. Leaves opposite, consisting of 2–5 leaflets which are attached at the apex of the leaf-stalk. Leaflet blades 3½–6 in. long, 3–4 times as long as broad, venation indistinct, midrib and a few lateral nerves alone visible. Fruit consisting of 2–5 carpels (cocci) ¼–⅜ in. long; outer surface yellowish-brown, ribbed and wrinkled and hairy; carpels splitting open at apex and side.—Common on Macpherson Range; Clarence River (F.v.M.) to Macpherson Range.

2. PLEIOCOCCA.

Pleiococca Wilcoxiana F.v.M. Small tree up to 50 ft. high. Leaves opposite; stalks $\frac{1}{2}$–$1\frac{1}{4}$ in.; blade (leaflet) articulate (jointed) at apex of stalk; 4–$6\frac{1}{2}$ in. long, 2–$2\frac{1}{2}$ times as long as broad; midrib, lateral nerves, and reticulate veins visible. Fruit fleshy, white, acid, globose in outline, $\frac{3}{4}$ in. diameter, composed of 5–9 carpels united at inner angle.—Clarence River (F.v.M.) to Eungella Range.

3. ZANTHOXYLUM.

Zanthoxylum brachyacanthum F.v.M. Thorny Yellowwood, Satinwood. Tree up to 30 ft. high and 6 in. stem diameter. Bark light grey, armed with numerous conical prickles; wood bright yellow. Branchlets and leaf rhachis armed with scattered sharp prickles. Leaves alternate, pinnate, consisting of 5–13 leaflets; leaflet stalklets $\frac{1}{8}$ in.; blades $1\frac{3}{4}$–$3\frac{1}{4}$ in. long, 2–3 times as long as broad. Fruit generally reduced to 1 coccus, $\frac{1}{4}$–$\frac{3}{8}$ in. long, opening in 2 valves and containing 1 black, glossy, egg-shaped seed $\frac{1}{5}$–$\frac{1}{4}$ in. long.—Clarence River (Benth.) to Eungella Range.

4. GEIJERA.

Geijera salicifolia Schott. Scrub Wilga, Greenheart, Green Satinheart. Figs. 95 and 96.

Derivation.—Geijera, according to F. M. Bailey, is named after J. D. Geijer; salicifolia from Latin *salix*, a willow; *folium*, a leaf (willow-leaved).

Description.—A tree attaining a height of about 80 ft. and a stem diameter of about 1 ft. 6 in. Stem not prominently flanged at the base. Bark mostly scaly, shed in small square or oblong pieces, dark grey or brown; when cut, fragrant, yellowish brown, paler inwards, after a few minutes' exposure turning a dirty blackish colour, $\frac{3}{8}$ in. thick on a tree with a stem diameter of 1 ft. 10 in. All parts of the tree hairless except a minute down on the branches of the inflorescence and on some of the young shoots. Leaf-stalks $\frac{3}{10}$–$\frac{3}{4}$ in. long or 1 in. long in luxuriant Northern specimens. Leaves alternate; leaf-blade very variable in breadth, narrowly lance-shaped to oval in outline, bluntly pointed at the apex, midrib and lateral nerves visible on both surfaces, net-veins obscure; minute transparent oil-dots are present; measurement of leaf-blade 3–4 in. long (sometimes $5\frac{1}{2}$ in. in Northern specimens), 2–6 times as long as broad. Flowers in inflorescences (panicles) at the ends of the branchlets, the panicles generally shorter than the leaves. Individual flowers stalkless or nearly so, almost $\frac{1}{4}$ in. in diameter when expanded; the lowermost part, the calyx, broadly cup-shaped, about $\frac{1}{10}$ in. diameter, with 5 broad, rounded lobes at the rim. On the inner side of the calyx are the 5 white triangular petals, each measuring about $\frac{1}{10}$ in. long. Alternating with the petals are 5 narrow bristle-like stamens, each measuring about $\frac{1}{12}$ in. long. In the centre of the flower and surrounded by a disk is the broad, 5-lobed, and 5-celled ovary crowned by a stalkless, almost gland-like, obscurely 5-lobed stigma. Generally 1 or 2 only of the cells of the ovary mature into the fruit. Each cell in the fruit is called a coccus, is nearly globular or egg-shaped, measures about $\frac{1}{4}$ in. in diameter, and contains a single black shining seed about $\frac{1}{5}$ in. in diameter.

Distribution.—Common in Queensland from the Tweed River on the south to the Barron River on the north; as far inland as Woolgar (200 miles inland from Townsville). N. S. Wales, from Illawarra to the Tweed River (J. H. Maiden).

Uses.—The timber could be used for indoor fittings where a heavy wood is suitable.

Remarks.—There are two races of this species, one with narrow, the other with broad leaves. The latter apparently is by far the commoner form. Although the extremes appear to be widely different they are connected by intermediate forms.

Reference.—*Geijera salicifolia* Schott, Fragm. Rut. Tablet 4.

Geijera Muelleri Benth. Field characters similar to those of *Geijera salicifolia* (*see* Figs. 95, 93 and description). The leaves resemble those of the broad-leaved forms of *Geijera salicifolia* but have fewer (4–6) lateral nerves on each side of midrib and less distinct venation. The flowers and fruit are similar to those of *G. salicifolia.* Synonym: *Geijera Helmsiae.*—N. S. Wales (Maid. and Betche); Brisbane River to Cumberland Ids. (Benth.).

5. EVODIA.

Evodia micrococca F.v.M. and **Evodia accedens** Blume are small trees with opposite leaves consisting of 3 leaflets. The fruit consists of 4 or fewer small carpels (cocci) splitting open; each carpel contains 1 seed.—*Evodia micrococca,* leaf-stalks $1\frac{1}{4}$–$2\frac{1}{4}$ in.; leaflets reversed lance-shaped, 2–4 in. long, 2–$2\frac{1}{2}$ times as long as broad; carpels $\frac{1}{4}$–$\frac{3}{8}$ in. long, seeds black and shining, egg-shaped, $\frac{1}{8}$–$\frac{1}{6}$ in. long. Illawarra (Benth.) to

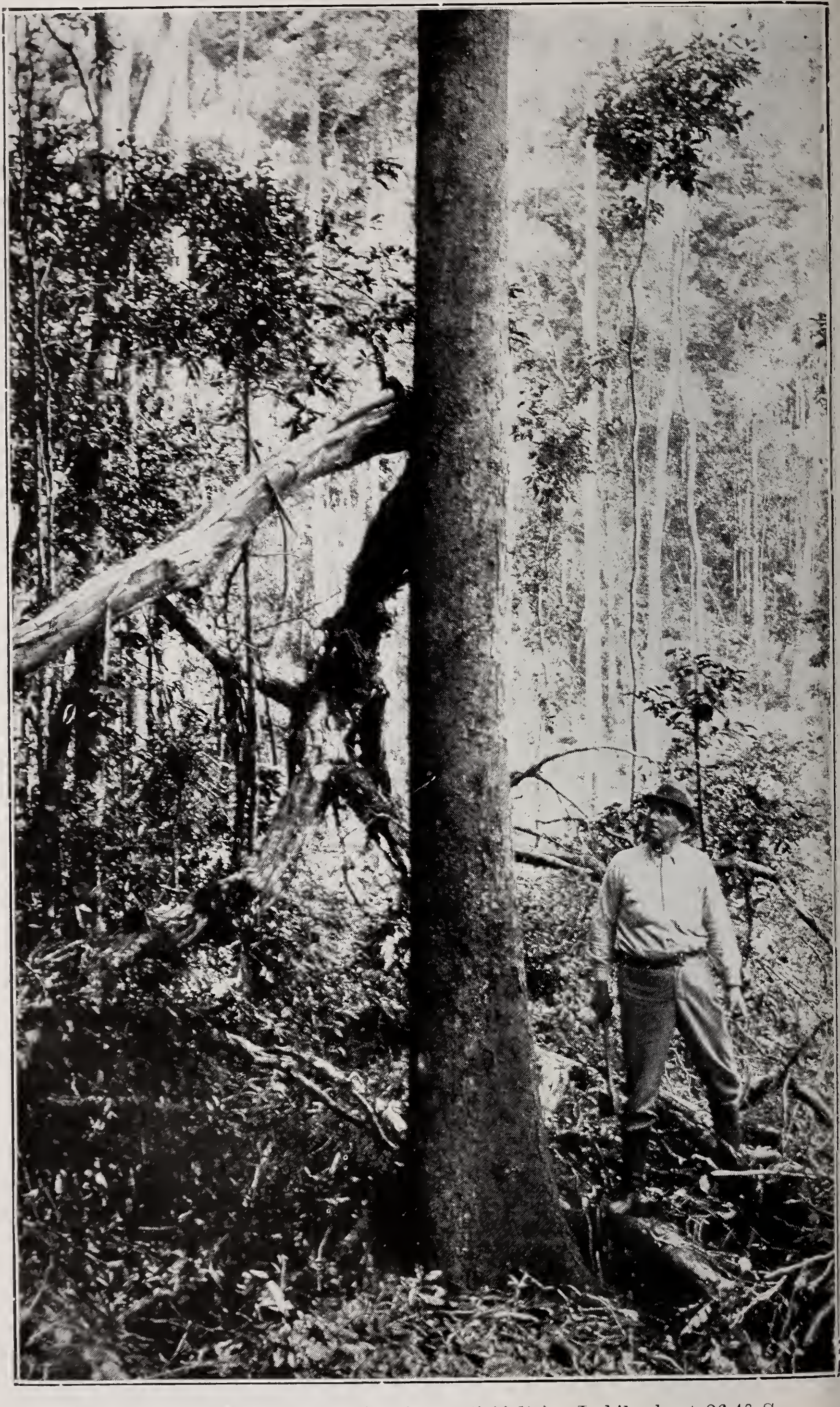


Fig. 95.—The Scrub Wilga (*Geijera salicifolia*). Imbil, about 26.4° S.

(*Photo.: W. D. F.*)

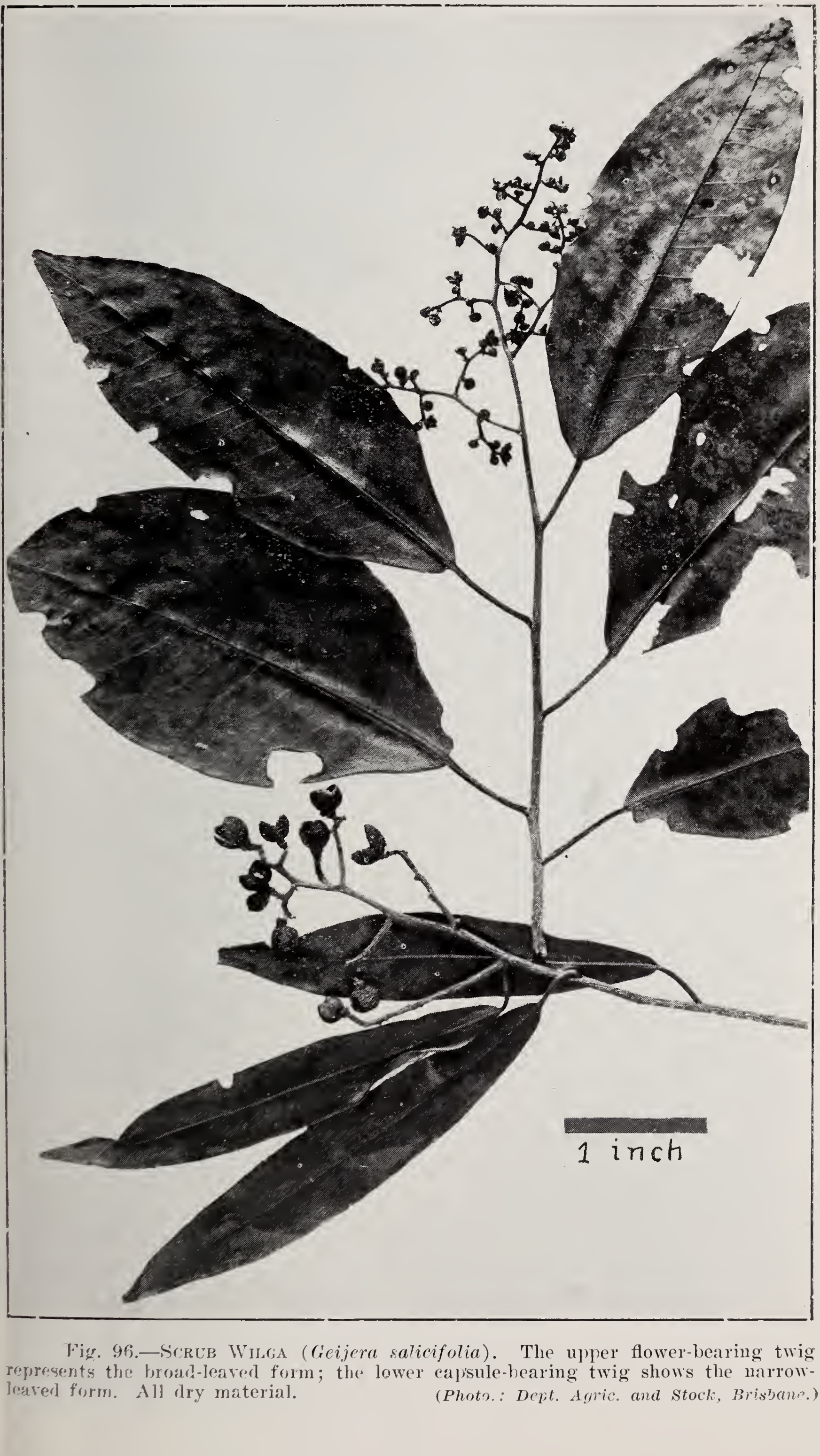


Fig. 96.—Scrub Wilga (*Geijera salicifolia*). The upper flower-bearing twig represents the broad-leaved form; the lower capsule-bearing twig shows the narrow-leaved form. All dry material. (*Photo.: Dept. Agric. and Stock, Brisbane.*)

Maryborough.—*Evodia accedens*, leaf-stalks $1\frac{3}{4}$–3 in. long; leaflets with distinct stalklet of $\frac{1}{4}$ in., 3–5 in. long, $2\frac{1}{2}$ times as long as broad; carpels $\frac{1}{4}$–$\frac{3}{8}$ in. long; seeds dark brown, egg-shaped, $\frac{1}{8}$ in. long. Richmond River (Maiden) to North Queensland; Papua.—*E. micrococca* is distinguished by its smaller leaflets gradually tapering at the base towards the apex of the leaf-stalk.

6. MELICOPE.

Melicope neurococca Benth., **M. erythrococca** Benth., and **M. australasica** F.v.M are small trees up to 60 ft. and 8 in. stem diameter. *M. melanophloia* C. T. White is an exception and grows to a larger size. The *Melicopes* have opposite leaves consisting of 3 leaflets (only 1 in *M. melanophloia*). The flowers consist of 4 (or 5) calyx lobes, 4 (or 5) petals, and 8 (or 10) stamens. The fruit consists of 4 (or 5) or fewer carpels similar to those of *Bosistoa* and *Evodia*, described above.—*M. neurococca*, leaf-stalks 1–2 in.; leaflets 3 (rarely 5), on distinct stalklets, blades 3–$4\frac{3}{4}$ in. long, 2–3 times as long as broad, tapering at both ends, venation prominent; carpels $\frac{1}{4}$–$\frac{3}{8}$ in. long, transversely ribbed outside. This species very closely resembles *Bosistoa transversa*; critical examination is required to show the characters, if any, upon which the two species can be separated; also known as *Bouchardatia neurococca* Baill. Hastings River (Benth.) to Maryborough.—*M. erythrococca*, leaf-stalks $\frac{1}{2}$–$1\frac{1}{2}$ in., leaflets with short or indistinct stalklets; blades lance-shaped, venation indistinct above, apex blunt or bluntly pointed, narrowed at base, 2–3 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ times as long as broad, carpels $\frac{1}{4}$ in. long, dark brown, transversely ribbed outside; seeds egg-shaped, $\frac{1}{8}$ in. long. Clarence River (Benth.) to Gympie.—*M. australasica*, leaf-stalks 1–$2\frac{3}{4}$ in.; leaflets 4–6 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ times as long as broad, venation prominent; carpels (of fruit) described by Bentham as angular, pointed, not $\frac{1}{6}$ in. long; seeds shining. Clarence River to Macpherson Range.

Melicope melanophloia C. T. White. Up to 100 ft. high and 2 ft. 3 in. stem diameter. Bark dark brown or almost black, rough but not scaly, when cut yellowish brown, $\frac{3}{8}$ in. thick on tree 2 ft. 3 in. stem diameter. Sapwood white. Leaf-stalks $\frac{1}{2}$–1 in.; blade (technically leaflet blade as there is a joint or articulation at apex of stalk) 4–6 in. long, 2–3 times as long as broad, venation not prominent; carpels (of fruit) yellowish brown, hairy, pointed at apex, $\frac{3}{8}$ in. long, but not mature. Wood very hard.—East of Gympie to Fraser Island.

7. PENTACERAS.

Pentaceras australis Hook. f. Bastard Crow's Ash. Tree up to 60 ft. high. Leaves alternate, pinnate, consisting of 7–15 leaflets, leaflet blade lance-shaped, tapering at base on one side of stalklet and abruptly terminated higher up on the other side of stalklet, midrib and lateral nerves alone visible, bluntly pointed or drawn out into a blunt point at apex, 2–4 in. long, 2–3 times as long as broad. Fruit carpels mostly reduced to 1, irregularly egg-shaped in outline, flat, surrounded by a broad wing, $1\frac{1}{4}$ x $\frac{3}{4}$ in. including wing.—Richmond River (Benth.) to Gympie.

8. MEDICOSMA.

Medicosma Cunninghamii Hook. f. Bonewood, Pinkheart. Tree up to 30 ft. high and 5 in. stem diameter. Wood brittle, yellowish white, often bright pink at or towards centre of woody cylinder. Leaves opposite; stalk $\frac{3}{8}$–$\frac{5}{8}$ in.; blades (technically leaflets) with midrib, lateral nerves, and a few net-veins visible, 3–5 in. long, $2\frac{1}{2}$–4 times as long as broad. Flowers large; calyx lobes 4, rounded, $\frac{1}{8}$ in. long; petals 4, finely hairy, $\frac{3}{4}$ in. long; stamens 8, $\frac{1}{2}$ in. long, filaments flattened and slightly united by their woolly margins. Fruit carpels 4, hairy, $\frac{1}{4}$ in. long.—Clarence River (Benth.) to Maryborough.

9. PAGETIA.

Pagetia medicinalis F.v.M. and **Pagetia monostylis** F. M. Bailey. Mostly small trees. Leaves opposite; simple leaves and leaves with 2–3 leaflets are sometimes found on the same twig, especially in *P. monostylis*, calyx lobes 5, petals 5, stamens 10, ovary 5-celled, fruit carpels 5 or fewer. Bark described as whitish.—*P. medicinalis*, leaves mostly simple, stalks $\frac{3}{8}$–$\frac{1}{10}$ in., often extremely short; blades rounded or heart-shaped at base, apex rounded or bluntly pointed, venation prominent on underside, $2\frac{3}{4}$–$5\frac{1}{2}$ in. long, $1\frac{1}{2}$–$2\frac{1}{2}$ times as long as broad; fruit-carpels mostly reduced to 1, $\frac{1}{2}$ in. long, hairy and yellowish brown, splitting open from the apex; seed single in each carpel, oval, $\frac{3}{8}$ in. long. Brisbane to Rockhampton.—*P. monostylis*, leaf-stalks $\frac{1}{4}$–$\frac{7}{8}$ in., blades 3–$5\frac{1}{2}$ in. long, 2–3 times as long as broad, venation prominent on both surfaces; differs from *P. medicinalis* in having longer leaf-stalks and narrower leaves which are not heart-shaped at base. F. M. Bailey states that this species attains 60 ft. in height. Eumundi, Queensland.

10. FLINDERSIA.

Flindersia australis R.Br. Crow's Ash, Teak, Flindosy, Flindersia. Figs. 97 and 98.

Derivation.—Flindersia commemorates Captain Matthew Flinders ; *australis* Latin, Southern.

Description.—A large tree attaining 130 ft. in height and a stem diameter of 5 ft. Stem not widely buttressed. Bark brown or dark brown, scaly, shed in hard, brown rounded flakes ; when cut it often shows a very thin green-coloured layer immediately beneath the thin outer brown bark ; beneath the green layer it is reddish brown and becomes pale or almost white towards the white sapwood ; measurement of bark, about ½ in. thick on a tree with a stem diameter of 2 ft. Young shoots and inflorescence covered with minute downy hairs. Leaves alternate or less frequently opposite, crowded towards the ends of the branchlets, pinnate, consisting of 3–13 leaflets. Each leaflet has the appearance of an ordinary leaf and the leaflets are in pairs on the leaf rhachis, to which they are attached by a very short stalklet ; the terminal odd leaflet is borne on a decidedly longer stalklet. The length of the common leaf-stalk between its insertion on the branchlet and the lowermost pair of leaflets varies from 2–4 in. The leaflets in outline are elliptical or narrowly egg-shaped, unequal-sided at the base, dark green above, paler underneath, midrib and lateral nerves alone prominent above, minute transparent dots copious ; measurement of leaflets, 2–4¼ in. long and about 2½ times as long as broad. Flowers in dense much-branched inflorescences (panicles) at the ends of the branchlets. Individual flowers white with a brown centre, measuring nearly ½ in. in diameter when expanded, on distinct stalklets. The lowermost part of the flower, the calyx, is very small, cup-shaped, downy and about ⅛ in. in diameter, with 5 lobes at its rim. On the inner side of the calyx are the 5 white petals, which are the largest parts of the flower, each petal measuring nearly ¼ in. long. On the inner side of the petals and shorter than them are 5 stamens alternating with 5 shorter bristle-like organs known as staminodia or abortive stamens. The ovary (in the centre of the flower) is surrounded at the base and sides by a crinkled disk, is hairy and 5-lobed, and bears at its summit a short style surmounted by a fleshy, lobed stigma. Capsule woody, 2–3 in. long, consisting of 5, rarely 4 or 6, boat-shaped valves covered on the back with blunt prickles ; the valves generally remain united at the base in this species. Each valve contains a central placenta on each side of which are 2 or 3 flat winged seeds. The placenta is longer and thicker than the seeds. The seeds are flat, produced into a thin border or wing at the upper end and measure about 1½ in. long including the wing. Flowering period : September, October, and November.

Distribution.—It is fairly abundant in coastal Queensland from the Tweed River on the south to Broadsound on the north, and, so far as known, not extending beyond about 100 miles inland. It is also found in the Northern Rivers district of New South Wales as far south as the Richmond River (J. H. Maiden).

Uses.—This is one of the most durable and widely used of all the rain-forest timbers and is useful for all general building purposes. Its most popular use is as flooring. Where Eucalyptus timbers are scarce it is sometimes used for fencing. Pores of wood single or in radial rows of 2–4 pores in each row. Soft tissue in concentric lines. When grown in the open the tree is among the handsomest and best shaped of our native species, and is well worthy of more extensive planting as a shade and ornamental species. The 5-rayed woody capsule is sometimes used as an ornament.

Reference.—*Flindersia australis*, R. Brown in Flinders' Voyage to Terra Australis, vol. ii., p. 595, Appendix, 1814.

Flindersia Schottiana F.v.M. Cudgerie, Bumpy Ash, Silver Ash. Figs. 99, 100, 101.

Derivation.—Flindersia commemorates Captain Matthew Flinders ; Schottiana, after Heinrich Schott.

Description.—A large tree attaining 150 ft. in height and a stem diameter of 3 ft. Stem not prominently buttressed ; in large trees it often has protuberances at intervals along the stem where the branches have fallen away in the course of growth. The name "Bumpy Ash" refers to these protuberances. Bark mostly grey, fairly smooth or finely warted ; when cut, yellow, ⅜ in. thick on a tree with a stem diameter of 1 ft. 3 in. Sapwood white. Young shoots, and leaves on young trees, downy ; the flowers and underside of mature leaves on older trees with fine hairs visible under a lens. Branchlets thick, marked by the scars of fallen leaves. Leaves opposite, pinnate, consisting of 9–17 leaflets disposed in pairs along the extended leaf-stalk (leaf rhachis) with a terminal odd leaflet. Each leaflet has the appearance of an ordinary leaf, has a very short scarcely distinct stalklet, is slightly curved and lance-shaped in outline, unequal-sided at the base and tapers into a point at the apex, upper surface dark green

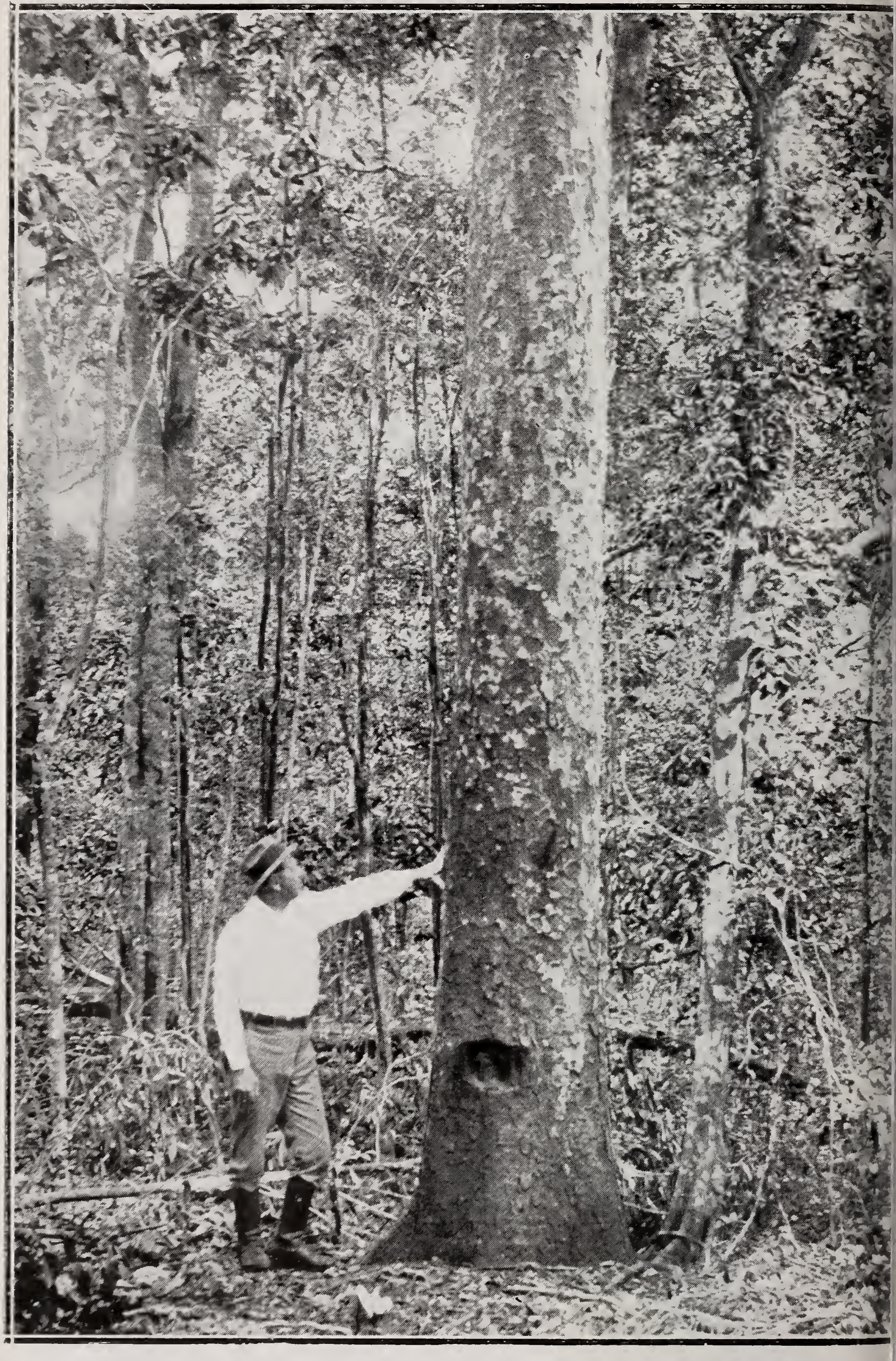
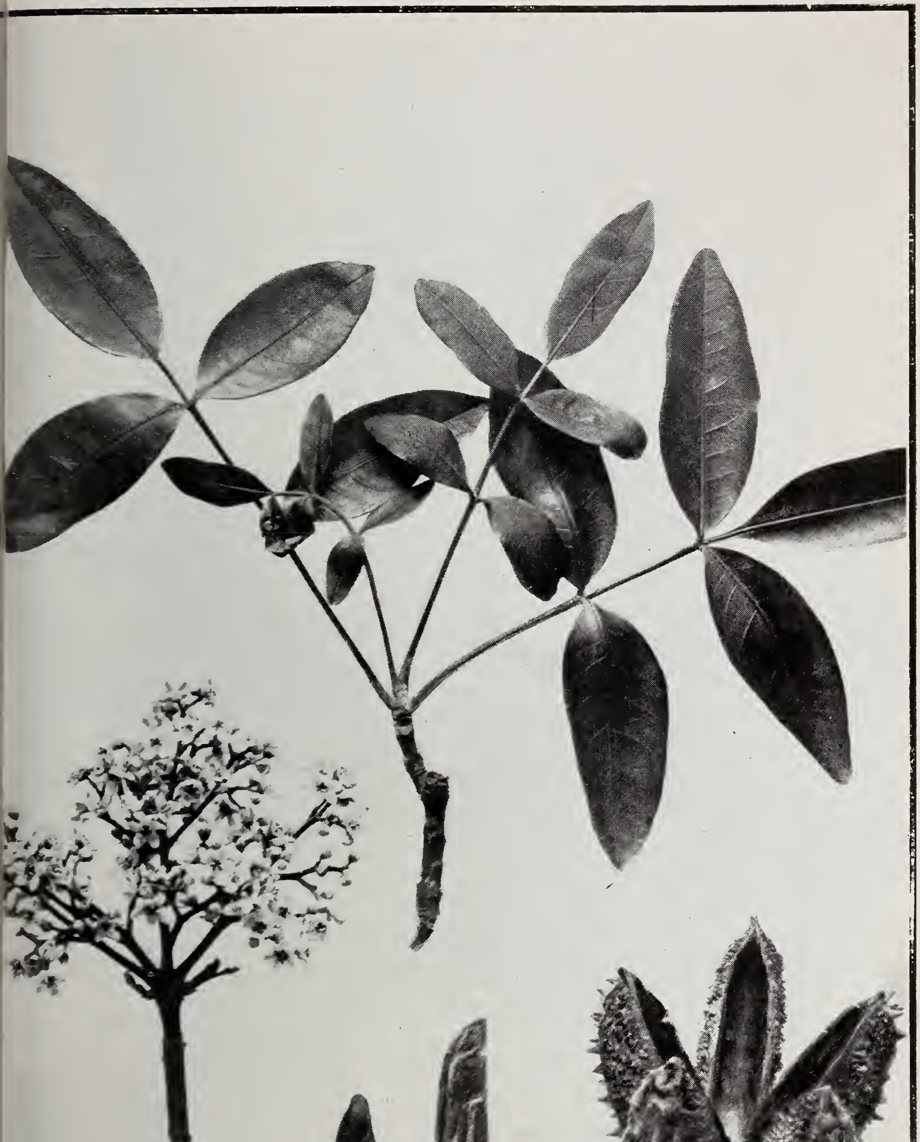


Fig. 97.—Crow's Ash (*Flindersia australis*). Imbil, about 26.4° S. The scaliness of the bark is indicated.

(*Photo.: W. D. F.*)



ig. 98.—Crow's Ash (*Flindersia australis*). Inflorescence on left. A, empty capsule; B, placenta; C, seed, showing the wing on side pointing downwards.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

and shining, under surface paler and greyish in colour ; numerous transparent oil-dots are visible in the leaflets ; measurement of blade of leaflets 3–5 in. long, 3–4 times as long as broad. On young trees the leaflets sometimes attain twice or thrice the foregoing measurement. Flowers with a honey-like fragrance, in very large, white, broad inflorescences (panicles) at the ends of the branchlets, the panicles as long as or shorter than the leaves. Individual flowers almost stalkless, very finely downy, measuring about $\frac{1}{3}$ in. in diameter when expanded ; the lowermost part, the calyx, cup-shaped, about $\frac{1}{10}$ in. in diameter, the rim divided into 5 rounded lobes. On the inner side of the calyx are 5 pale-yellow oval petals, each measuring about $\frac{1}{6}$ in. long. On the inner side of the petals are 5 incurved stamens about half the length of the petals ; alternating with the stamens and shorter than them are 5 staminodia (abortive stamens). The ovary, in the centre of the flower, is surrounded at the base by a yellow disk, is globular and hairy, and bears a minute green, hairless, rounded stigma at its apex. Fruiting capsule about 4 in. long, separating into 5 narrow boat-shaped valves with short almost triangular woody prickles on the back. Each valve is almost divided by a placenta into 2 compartments. Seeds 2 or more in each valve, situated on each side of the placenta, flat and bordered by a thin wing, $1\frac{1}{2}$–2 in. long and about $\frac{1}{2}$ in. broad including the wing. Flowering period : November.

Distribution.—Coastal scrubs from River Hastings, N.S.W. (J. H. Maiden), to Herberton district, North Queensland.

Uses.—The timber sometimes shrinks irregularly. When properly seasoned it could be used for general indoor work and fittings. It is more durable in the weather than many of the scrub woods, and has been used by selectors for shingles, slabs, and rails. The timber is lighter than Crow's Ash. The pores of the wood are single or sometimes arranged in radial rows of two pores to each row ; soft tissue in concentric lines.

Reference.—*Flindersia Schottiana* F.v.Mueller, Fragmenta Phytographiae Australiae, vol. iii., p. 25, 1862–1863.

Flindersia Oxleyana F.v.M. Yellowwood, Long Jack, Yellowwood Ash. Figs. 102 and 103.

Derivation.—Flindersia, in honour of Captain Matthew Flinders ; Oxleyana, after John Oxley.

Description.—A tree attaining 140 ft. in height and a stem diameter of about 3 ft. Stem not prominently buttressed. Bark grey or greyish brown, scaly, shed in oblong pieces ; when cut, outer part brown, inner part dull yellow, $\frac{3}{4}$ in. thick on a tree with a stem diameter of 2 ft. 2 in. Young shoots, young branchlets, branches of the inflorescence, and sometimes the stalks and undersides of the leaves minutely downy, the hairs often star-shaped (stellate). Leaves opposite, often crowded towards the ends of the branchlets, pinnate, consisting of 4–11 leaflets. Each leaflet has the appearance of an ordinary leaf and the leaflets are in pairs along the leaf rhachis, to which they are attached by a stalklet $\frac{1}{12}$–$\frac{1}{5}$ in. long ; the terminal odd leaflet is borne on a much longer stalklet. The length of the common leaf-stalk between its insertion on the branchlet and the lowermost pair of leaflets varies from $1\frac{1}{4}$–$2\frac{1}{2}$ in. The leaflets in outline are elliptical or lance-shaped, bluntly pointed at the apex, unequal-sided at the base, midrib and lateral nerves alone conspicuous on both surfaces ; measurement of leaflet blade, 2–4 in. long, $3\frac{1}{2}$–$4\frac{1}{2}$ times as long as broad. Flowers in large inflorescences (panicles) at the ends of the branchlets or in the forks of the upper leaves, the panicles sometimes as long as the leaves. Individual flowers about $\frac{1}{3}$ in. in diameter when expanded ; the lowermost part, the calyx, cup-shaped, about $\frac{1}{12}$ in. in diameter, consisting of 5 round minutely hairy lobes. On the inner side of the calyx are 5 cream-coloured oval petals each about $\frac{1}{6}$ in. long. On the inner side of the petals and alternating with them are 5 stamens each about $\frac{1}{8}$ in. long. Alternating with the stamens and shorter than them are 5 staminodia (undeveloped stamens). The ovary, which occupies the central part of the flower, is surrounded at the base by a disk, is round, densely hairy, 5-celled, and surmounted by a minute round stigma. Fruit consisting of 5 woody, boat-shaped valves, 3–4 in. long, each valve covered on the back by short blunt prickles and containing a woody inner partition (placenta) with 2 or 3 long, flat, thin seeds on each side of it. Seeds with a broad, thin border, measuring about 2 in. long and over $\frac{1}{2}$ in. broad including the border. Flowering period : December and January.

Distribution.—Scrubs of the coastal area of subtropical Australia from the Richmond River, N.S.W. (J. H. Maiden), to Gympie, Queensland.

Uses.—The timber is used in coachbuilding, railway carriage frames, cabinet-making, and joinery (R. T. Baker). The suitability of the wood for coachbuilding is well recognised in Queensland. The pores of the wood are single or sometimes arranged in radial rows of 2 pores to each row. Soft tissue in tangential lines or inconspicuous.

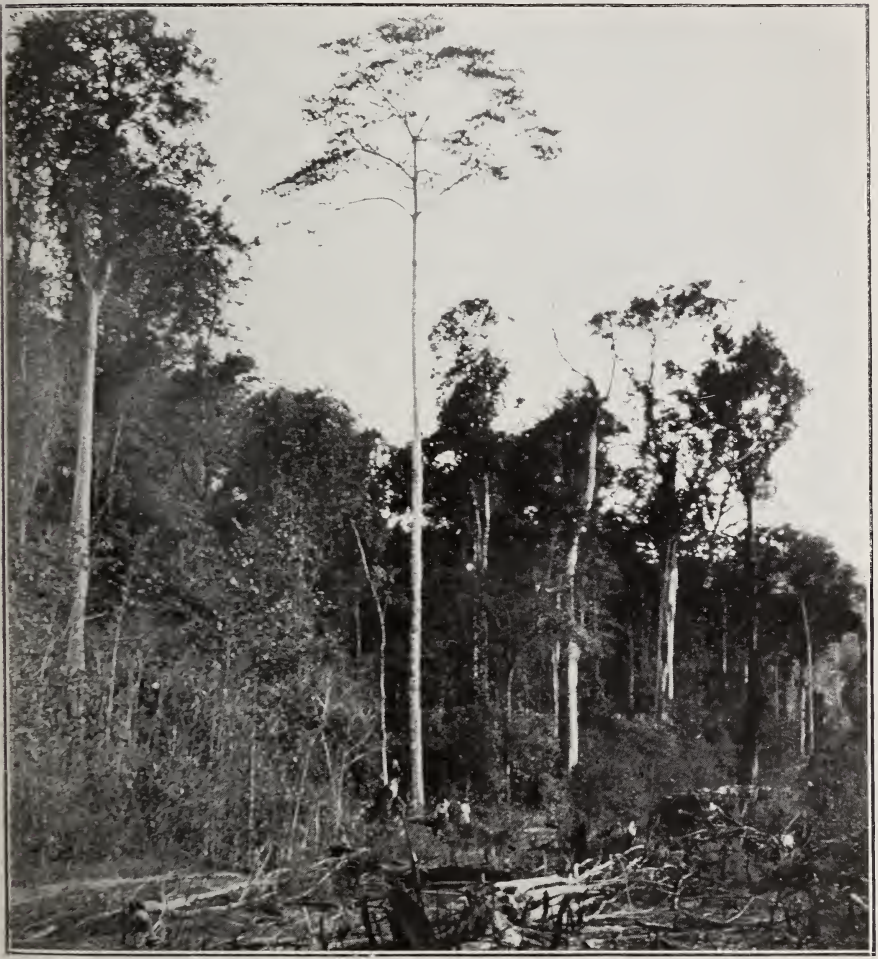


Fig. 99.—Bumpy Ash (*Flindersia Schottiana*), towards middle. The picture shows a section through rain forest at roadside, Kin Kin, about 26.2° S. The two figures at the base of tree on right give an idea of the scale. Total height of tree about 140 feet.

(*Photo.: W. D. F.*)

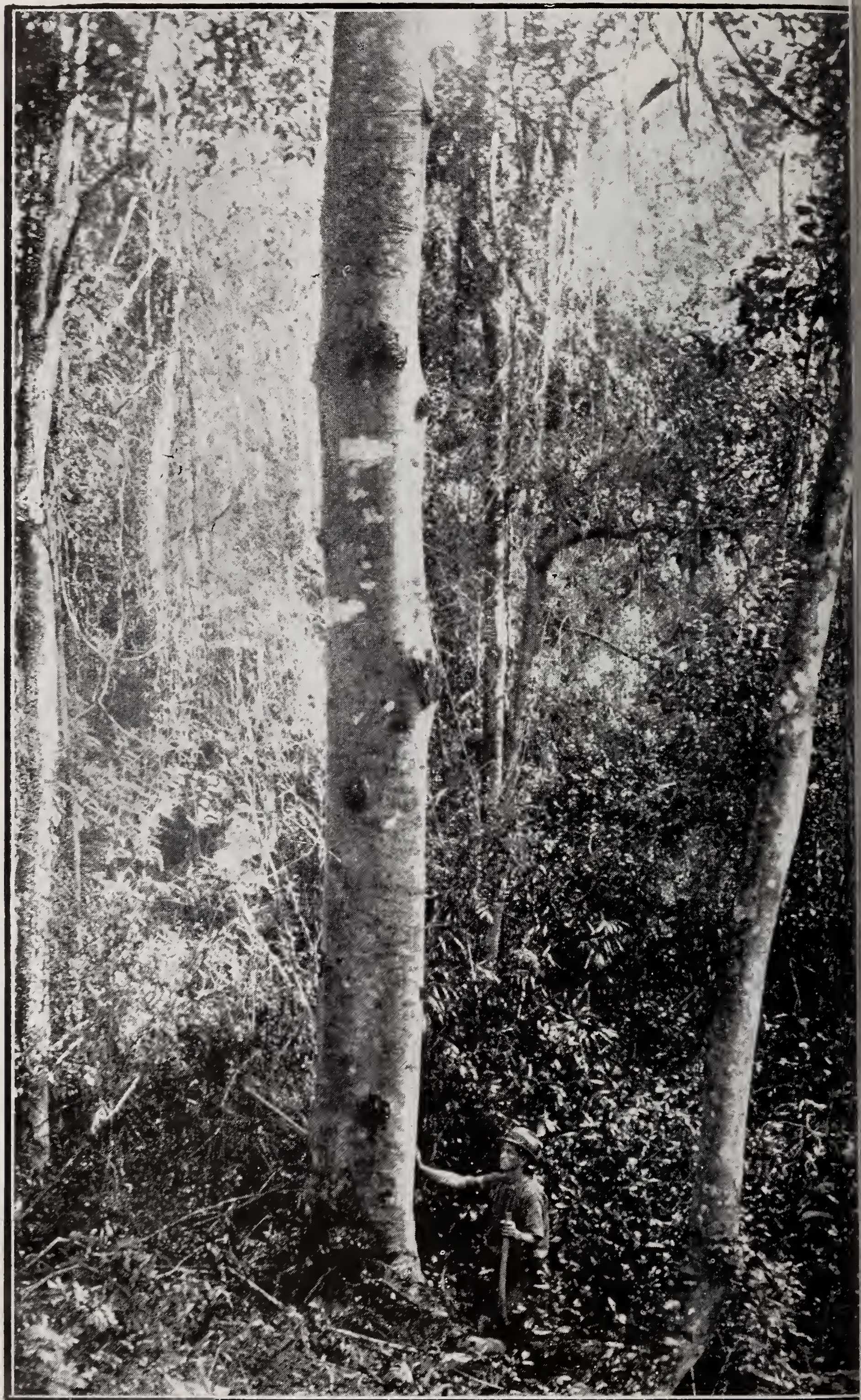
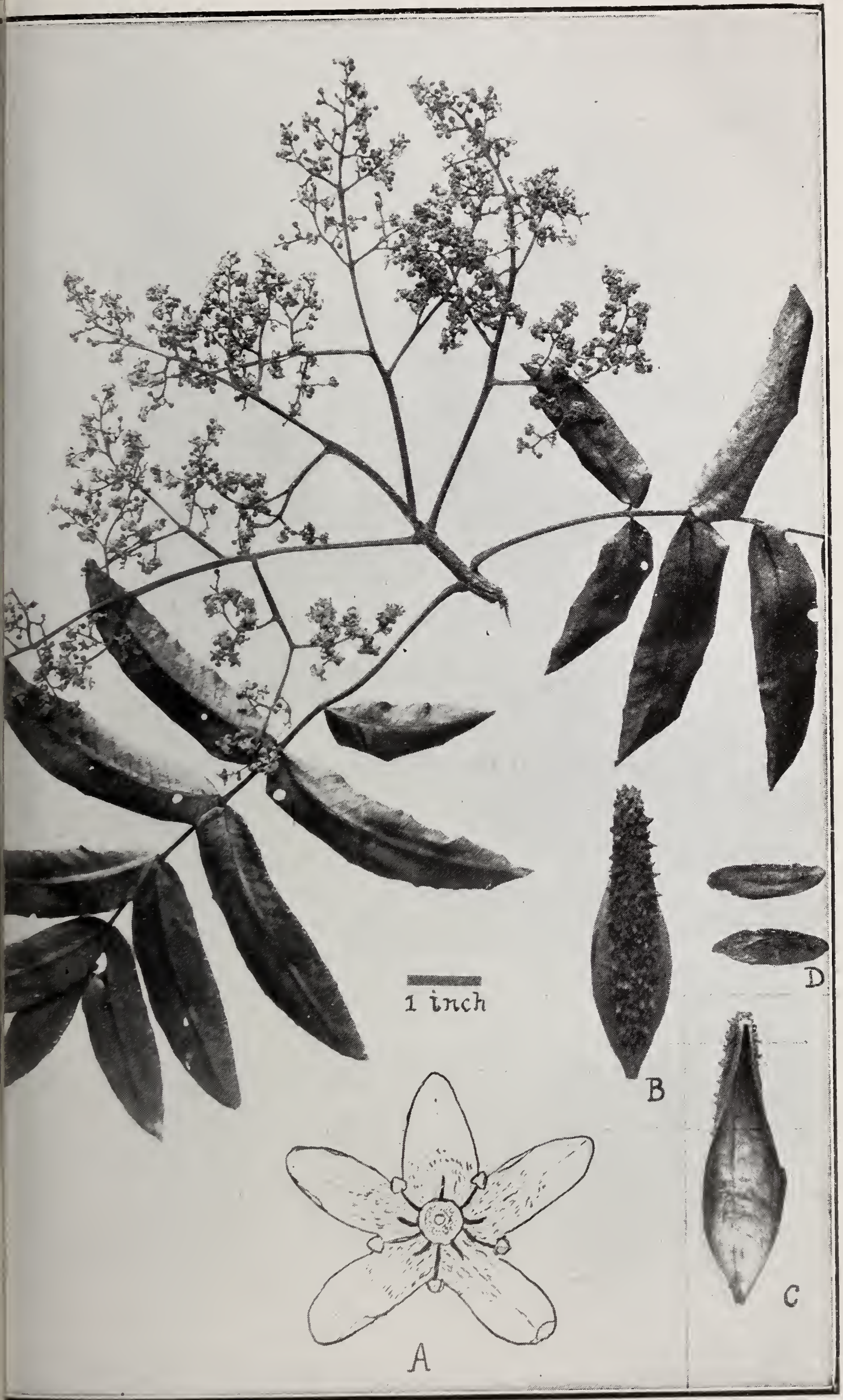


Fig. 100.—Bumpy Ash (*Flindersia Schottiana*). Imbil, about 26.4° S. The characteristic protuberances at intervals along the stem are shown. (*Photo.: W. D. F.*)



101.—Bumpy Ash (*Flindersia Schottiana*). A, flower (drawn by C. T. White); B, capsule lve, showing outer side; C, capsule valve. showing inner side; D, seeds. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

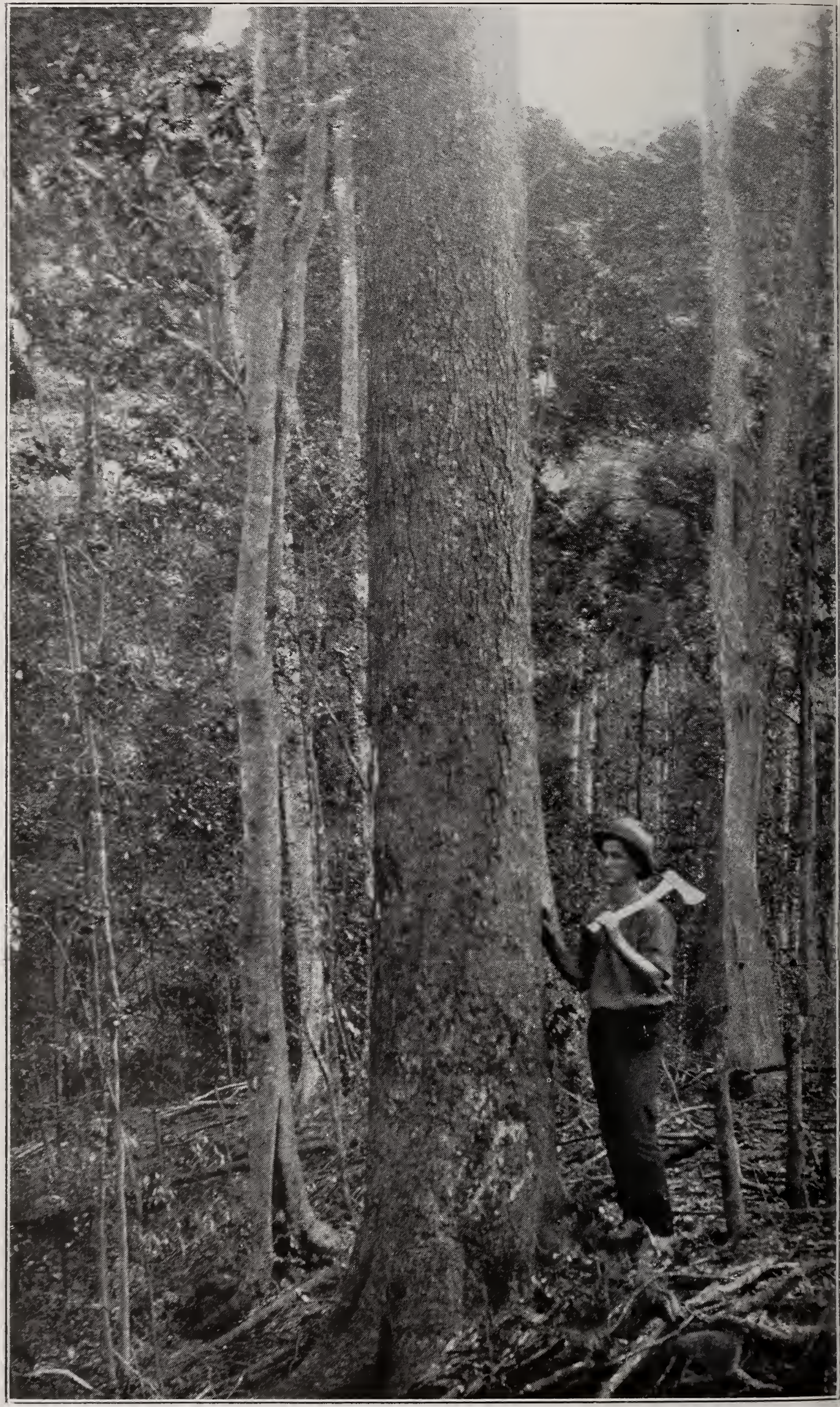


Fig. 102.—Yellow-wood (*Flindersia Oxleyana*). Imbil, about 26.4° S.

(*Photo.: W. D. F.*)

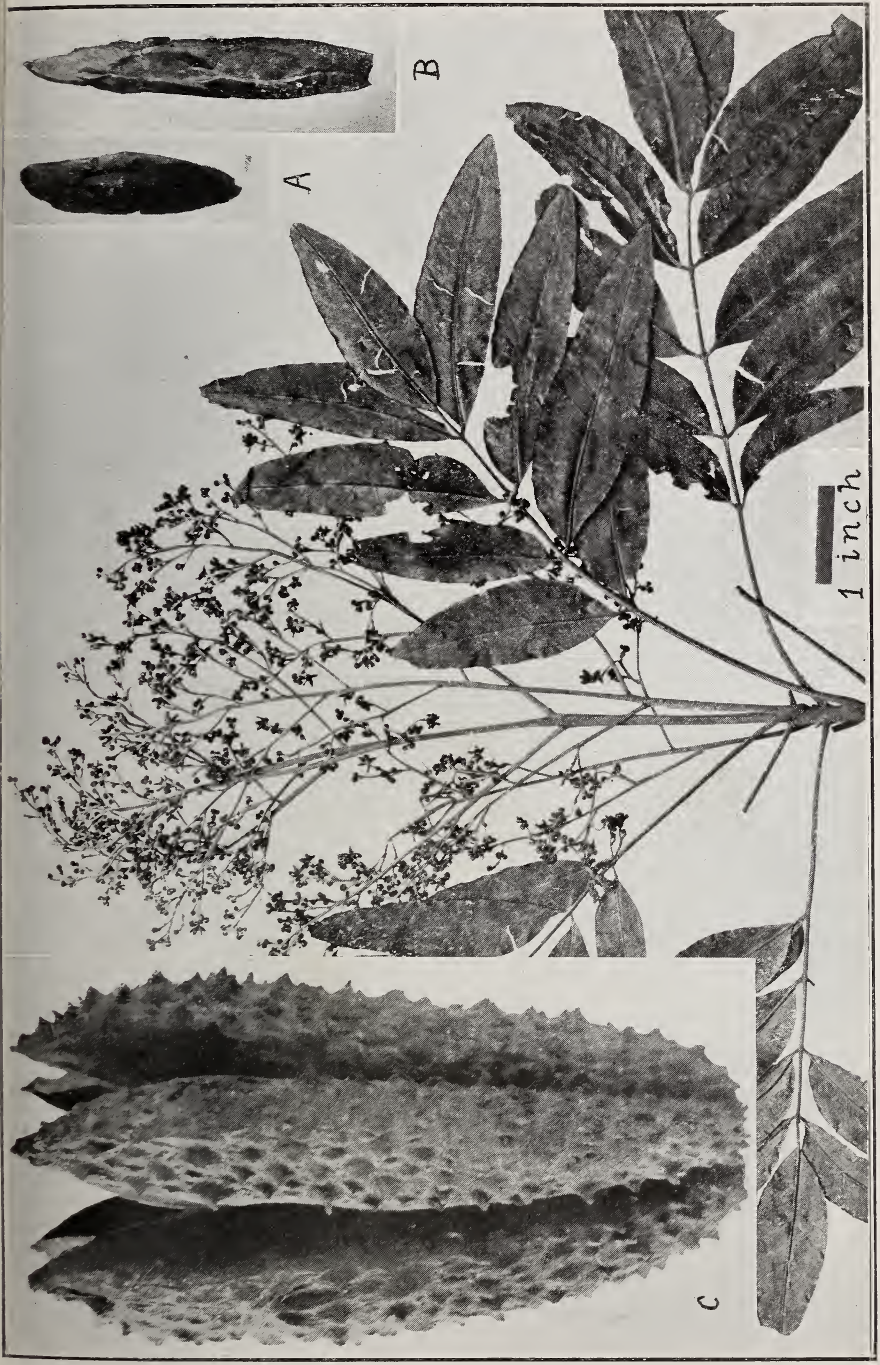


Fig. 103.—Yellow-wood (*Flindersia Oxleyana*). A, seed; B, placenta; C, capsule. The inch scale applies to all figures, except C which is natural size. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Reference.—*Flindersia Oxleyana* F.v.Mueller, Fragmenta Phytographiae Australiae, vol. i., p. 65, 1858–1859.

Flindersia Bennettiana F.v.M. Bennett's Ash. Figs. 104 and 105.

Derivation.—Flindersia, in honour of Captain Matthew Flinders; Bennettiana, after Dr. George Bennett.

Description.—A tree attaining a height of 130 ft. and a stem diameter of about 3 ft. Stem not prominently buttressed. Bark generally grey, fairly smooth or finely pustular like that of *Flindersia Schottiana* but without the prominent protuberances of the stem of that tree, sometimes finely scaly in patches; when cut, purplish brown towards outside, cream-coloured inwards, measuring $\frac{1}{2}$ in. thick on a tree with a stem diameter of 1 ft. 6 in. Young shoots and branches of the inflorescence minutely downy, the hairs often star-shaped (stellate). Leaves opposite, pinnate, consisting of 3–8 leaflets. Each leaflet has the appearance of an ordinary leaf and the leaflets are in pairs on the leaf rhachis, to which they are attached by a stalklet $\frac{1}{12}$–$\frac{1}{8}$ in. long. The length of the common leaf-stalk between its insertion on the branchlet and the lowermost pair of leaflets varies from $1\frac{1}{2}$ to over 3 in. The leaflets are oval or elliptical in outline, blunt or seldom shortly and bluntly pointed at the apex, sometimes slightly unequal-sided at the base, upper surface glossy, under surface duller; midrib, lateral nerves, and net-veins visible on both surfaces; measurement of leaflet blade $3\frac{1}{2}$–6 in. long, 2–3 times as long as broad. Flowers in large inflorescences (panicles) at the ends of branchlets and sometimes in the forks of the upper leaves, the panicles sometimes a little longer than the leaves. Individual flowers about $\frac{1}{3}$ in. in diameter when expanded; the lowermost part, the calyx, nearly cup-shaped, minutely hairy, about $\frac{1}{12}$ in. in diameter, divided into 5 nearly oval lobes. On the inner side of the calyx and alternating with its lobes are 5 cream-coloured petals, oval in outline, very minutely hairy on the outside, and measuring about $\frac{1}{6}$ in. long. On the inner side of the petals and alternating with them are 5 stamens slightly shorter than the petals, and alternating with the stamens and measuring about half as long as them are 5 staminodia (undeveloped stamens). The ovary, situated in the centre of the flower, is surrounded at the base by a disk, is nearly globular, densely downy, 5-celled, and surmounted by a small round stigma. Fruit consisting of 5 narrow, woody, boat-shaped valves densely covered on the back with short fairly blunt prickles. Each valve measures from 2–3 in. long and contains a narrow partition (placenta) on each side of which are 2 or 3 seeds surrounded by a thin broad border. The seeds measure about $1\frac{1}{2}$ in. long and $\frac{1}{3}$ in. wide including the border or wing. Flowering period: September and October.

Distribution.—Coastal scrubs of Eastern Australia from the Clarence River, N.S.W. (J. H. Maiden), to Maryborough, Queensland.

Uses.—The timber should be useful for general indoor work and cabinet-making.

Reference.—*Flindersia Bennettiana* F.v.Mueller in Bentham's Flora Australiensis, vol. i., p. 389, 1863.

Flindersia collina F.M.B. Broad-leaved Leopard Tree, Bastard Crow's Ash, Leatherwood, Leopard Ash. Figs. 106 and 107.

Derivation.—Flindersia commemorates Captain Matthew Flinders; collina from Latin *collis*, a hill (refers to the tree often growing on hills).

Description.—A medium-sized tree sometimes attaining 100 ft. in height and 2 ft. 3 in. in stem diameter. Bark greenish grey, shed in rounded or irregularly oval pieces which leave the very prominent depressions on the surface from which the name Leopard Tree is derived. When the bark is cut it is seen to have an exceedingly thin green outermost layer, a broader reddish middle layer, and a white innermost layer adjoining the sapwood. The bark is $\frac{3}{8}$ in. thick on a tree with a stem diameter of 2 ft. 3 in. Leaves opposite (or often alternate on seedlings and coppice shoots), pinnate, consisting of from 3–7 leaflets. Each leaflet has the appearance of an ordinary leaf, is elliptical, rounded or blunt at the apex and sometimes narrowed at the base, is stalkless, and measures from 1–3 in. in length, 2–3 times as long as broad. The leaves of immature trees and coppice growths are often dissimilar to those of mature trees. In the former case the leaflets are broader and often indented at the apex, and the axis (leaf rhachis) to which they are attached is broadly flattened or winged. The young shoots and stalks of the inflorescence are often covered with a rust-coloured down. Flowers in large inflorescences (panicles) at the ends of the branchlets. The individual flowers, which are on stalklets varying in length from $\frac{1}{16}$–$\frac{1}{8}$ in., measure over $\frac{1}{4}$ in. in diameter when fully expanded. The lowest part of the flower, the calyx, is 5-lobed and about $\frac{1}{10}$ in. in diameter. On the inner side of the calyx are the 5 white oval petals about $\frac{1}{6}$ in. in length. On the inner side of the petals and shorter than them are 5 slender stamens alternating with 5 staminodia. The ovary (in centre of flower) is round and hairy with a short style at its apex. Fruit narrowly elliptical, $1\frac{1}{2}$–2 in.

long, separating into 5 boat-shaped valves with tubercles on the back. Seeds contained in the inner hollow of the valves on each side of a flat partition-like placenta. Each seed exceeds 1 in. in length including its membranous border or wing. Flowering period : September.

Distribution.—Generally in the drier scrubs of Southern Queensland such as those of Rosewood, Nanango, Eidsvold, &c., in which it is very common. It has been found as far north as Childers, neighbourhood of Bundaberg, and as far west as Taroom, about 160 miles inland. Also found in Northern N. S. Wales (J. H. Maiden).

Uses.—The wood should be useful for indoor fittings.

Reference.—*Flindersia collina* F. M. Bailey in Queensland Agricultural Journal, vol. iii., p. 354, 1898. C. T. White (Proceedings of Linnean Society of N. S. Wales, vol. 46, p. 328, 1921) points out that the species was originally named by F. M. Bailey as variety *latifolia* of *Flindersia Strezeleckiana* F.v.M. (*see* F. M. Bailey, First Supplement to Synopsis of Queensland Flora, p. 12, 1886).

11. ACRONYCHIA.

The **Acronychias** are generally small trees. Calyx 4-lobed, petals 4, stamens 8, fruit 4-celled, indehiscent, and more or less succulent.

A. laevis Forst. Up to 50 ft. in height and 8 in. stem diameter. Leaves opposite, stalks $\frac{1}{4}$–$\frac{1}{2}$ in. ; blades reversed lance shaped often broadest towards apex, apex rounded or bluntly pointed ; midrib, lateral nerves, and net-veins visible on both sides ; $1\frac{3}{4}$–3 in. long, 2–$2\frac{1}{2}$ times as long as broad. Fruit fleshy, white, yellow, or purplish, up to $\frac{1}{2}$ in. diameter, obtusely 4-angled, containing 4 cells, each cell containing 1 or 2 egg-shaped, dark-coated seeds $\frac{1}{8}$ in. long. Lake King (Benth.) to Atherton ; New Caledonia.—**A. Baueri** Schott. resembles *A. laevis* but has slightly larger leaves and fruit which are hard or only slightly succulent. In *A. Baueri* there is only 1 seed in each cell of the fruit and the seeds are $\frac{1}{5}$ in. long. Illawarra (Benth.) to Atherton ; Lord Howe Id.—**A. acidula** F.v.M. has large leaves 5–8 in. long and large, fleshy, acid fruit $\frac{1}{2}$–$\frac{5}{6}$ in. long. Richmond River (Maiden) to Cairns.—**A. Scortechinii** F. M. Bailey resembles *A. laevis* but, according to F. M. Bailey, has globular reddish fruit exceeding $\frac{1}{2}$ in. diameter. Logan River to Atherton.—**A. melicopoides** F.v.M. var. *lasiantha* F.v.M. has hairy young branchlets, 3 leaflets $2\frac{1}{2}$–5 in. long and large, fleshy, white fruit up to $\frac{3}{4}$ in. long and $1\frac{1}{2}$ in. broad, acid and somewhat turpentine-like in flavour. Clarence River (F.v.M.) to Gympie.

12. HALFORDIA.

Halfordia drupifera F.v.M. Southern Ghittoe, Saffronheart. Figs. 108 and 109.

Derivation.—Halfordia, after Dr. G. B. Halford ; drupifera from Latin *drupa*, a stone-fruit ; *fero*, I bear (alluding to the stone-fruit of the species).

Description.—A tree attaining a height of 90 ft. and a stem diameter of 2 ft. 3 in. Stem not buttressed. Bark grey, more or less wrinkled in large trees, when cut, brown or very light brown becoming paler towards sapwood, measuring $\frac{3}{4}$ in. thick on a tree with a stem diameter of 2 ft. Sapwood surface yellow. With the exception of some parts of the flowers all parts of the tree are hairless. Branchlets smooth and green. Leaves alternate. Leaf-stalks $\frac{1}{6}$–$\frac{1}{2}$ in. long. Leaf-blades lance-shaped or reversed lance-shaped, mostly broader in upper half, apex bluntly pointed or drawn out into a distinct blunt point, base gradually narrowed into leaf-stalk, midrib and lateral nerves visible but not prominent on both surfaces ; measurement of leaf-blade 2–$4\frac{1}{2}$ in. long, 2–3 times as long as broad. Flowers in inflorescences (paniculate cymes) at the ends of branchlets, the inflorescences shorter than the leaves. Each flower is borne on a stalklet $\frac{1}{12}$–$\frac{1}{8}$ in. long. Individual flowers about $\frac{1}{2}$ in. diameter when expanded. The lowermost part of the flower, the calyx, is broadly basin shaped, about $\frac{1}{12}$ in. diameter, and bears 5 broadly triangular lobes less than $\frac{1}{24}$ in. long at its rim. Above or on the inner side of the calyx are 5 petals, narrowly triangular in outline, and measuring $\frac{1}{4}$ in. long and almost $\frac{1}{12}$ in. in width at base, the outer side is clothed with very fine hairs. On the inner side of the petals are 10 stamens, the longest of which are about $\frac{1}{4}$ in. long ; the stamens situated opposite to the petals are shorter than those alternating with the petals ; the filaments (stalklets) are flattened towards the base and are fringed with fine hairs on the edges ; the anthers are oval or heart-shaped in outline and less than $\frac{1}{24}$ in. long ; they are attached at the back to the filaments. Ovary (in centre of flower) hairless, egg-shaped, the basal portion (? disk) bearing 10 longitudinal short ribs ; the style at the apex of the ovary is smooth and cylindrical and less than $\frac{1}{12}$ in. long. Fruit bluish black or purple, oval or globose, about $\frac{1}{2}$ in. long, the pulp surrounding a hard "stone" (putamen) which surrounds 3–5 cells : when the seeds mature each cell contains a seed. Seeds narrowly elliptical, $\frac{1}{8}$–$\frac{1}{6}$ in. long, with a smooth very dark brown seed-coat. Flowering period : January and February. Fruit have been collected in October and November.

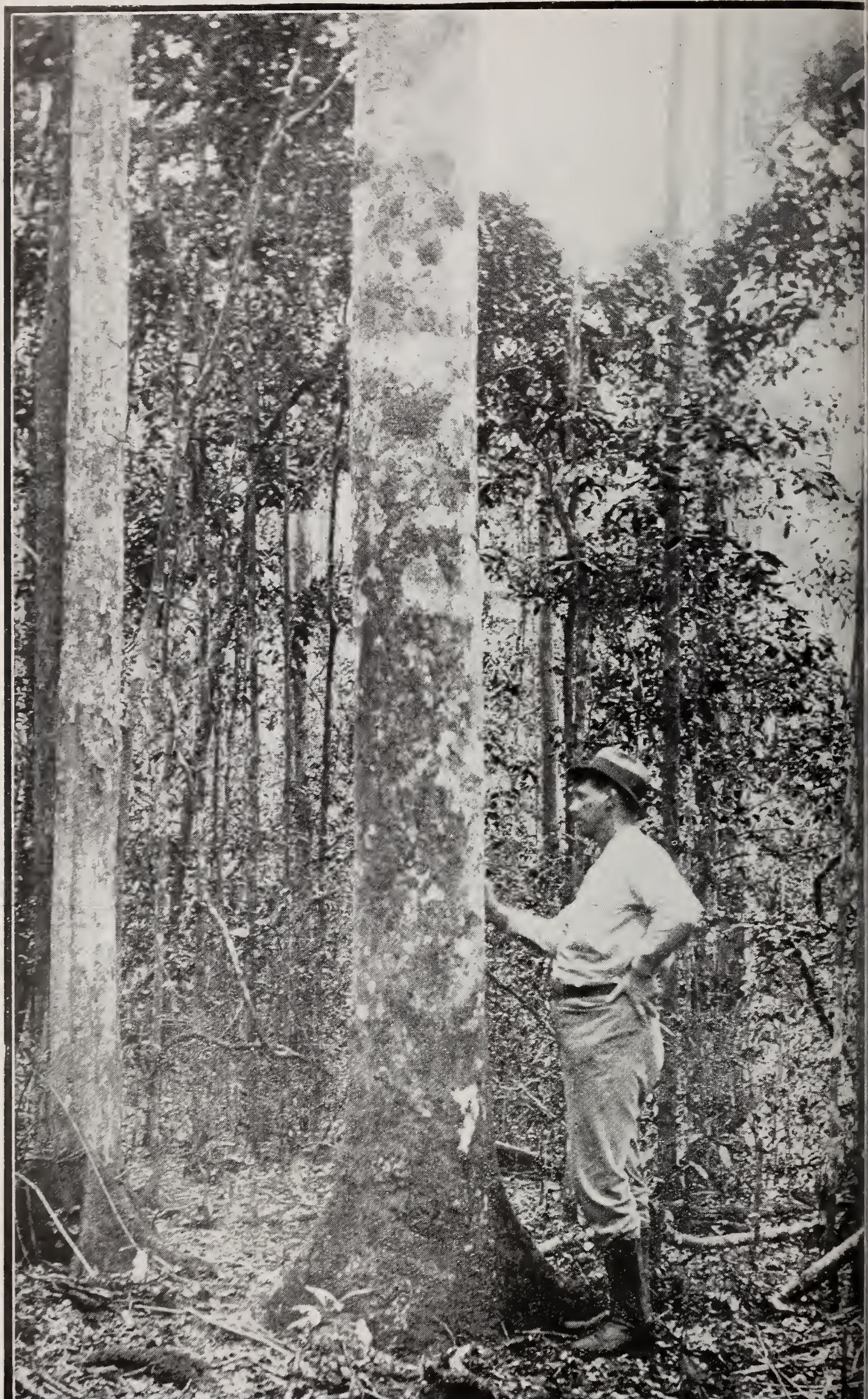


Fig. 104. Bennett's Ash (*Flindersia Bennettiana*). Imbil, about 26.4° S.
(*Photo.: W. D. F.*)

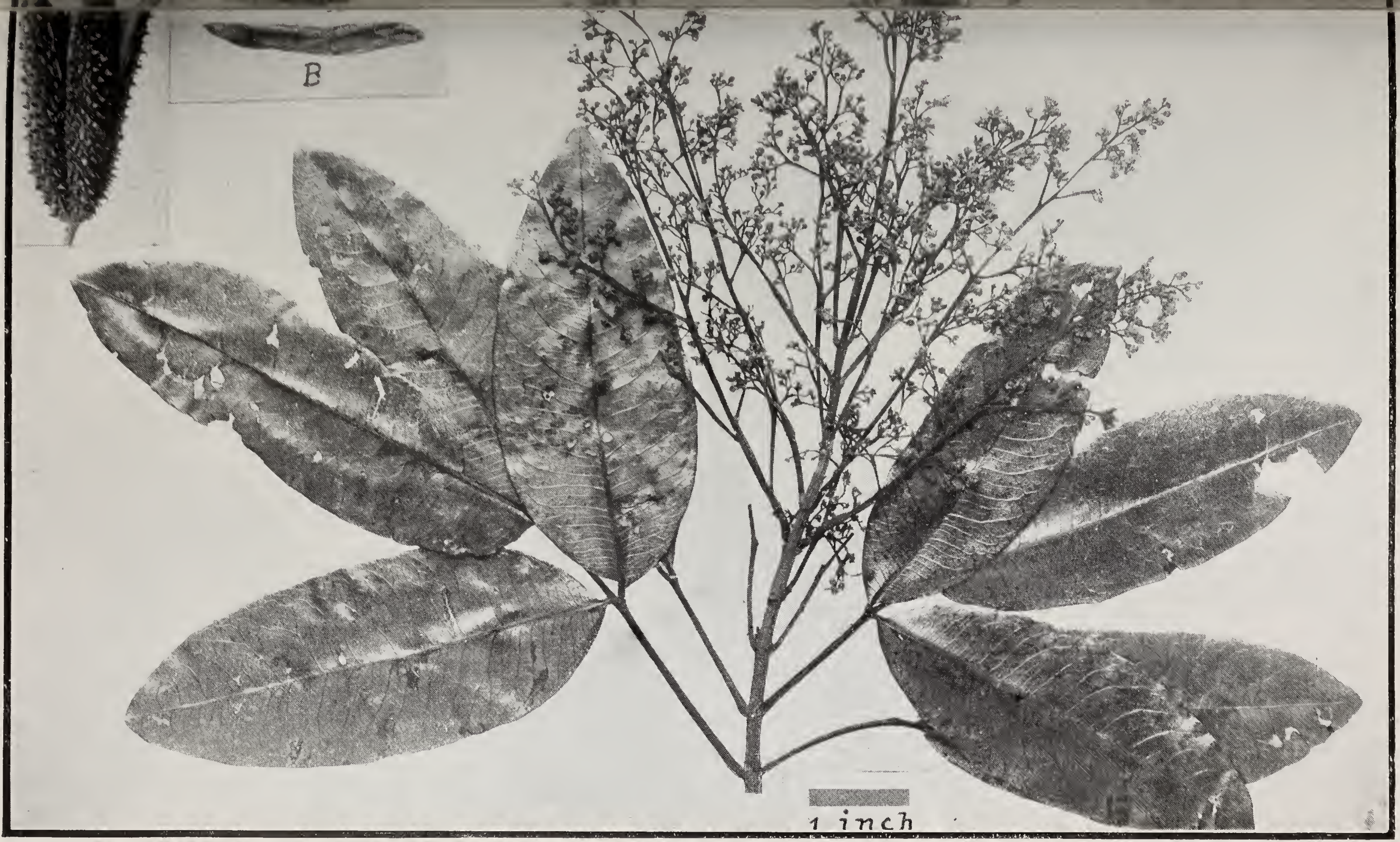


Fig. 105.—Flindersia Bennettiana. B, placenta; A, seed; capsule to the left of B. All figures to inch scale. All dry material.

(Photo.: Dept. Agric. and Stock, Brisbane.)

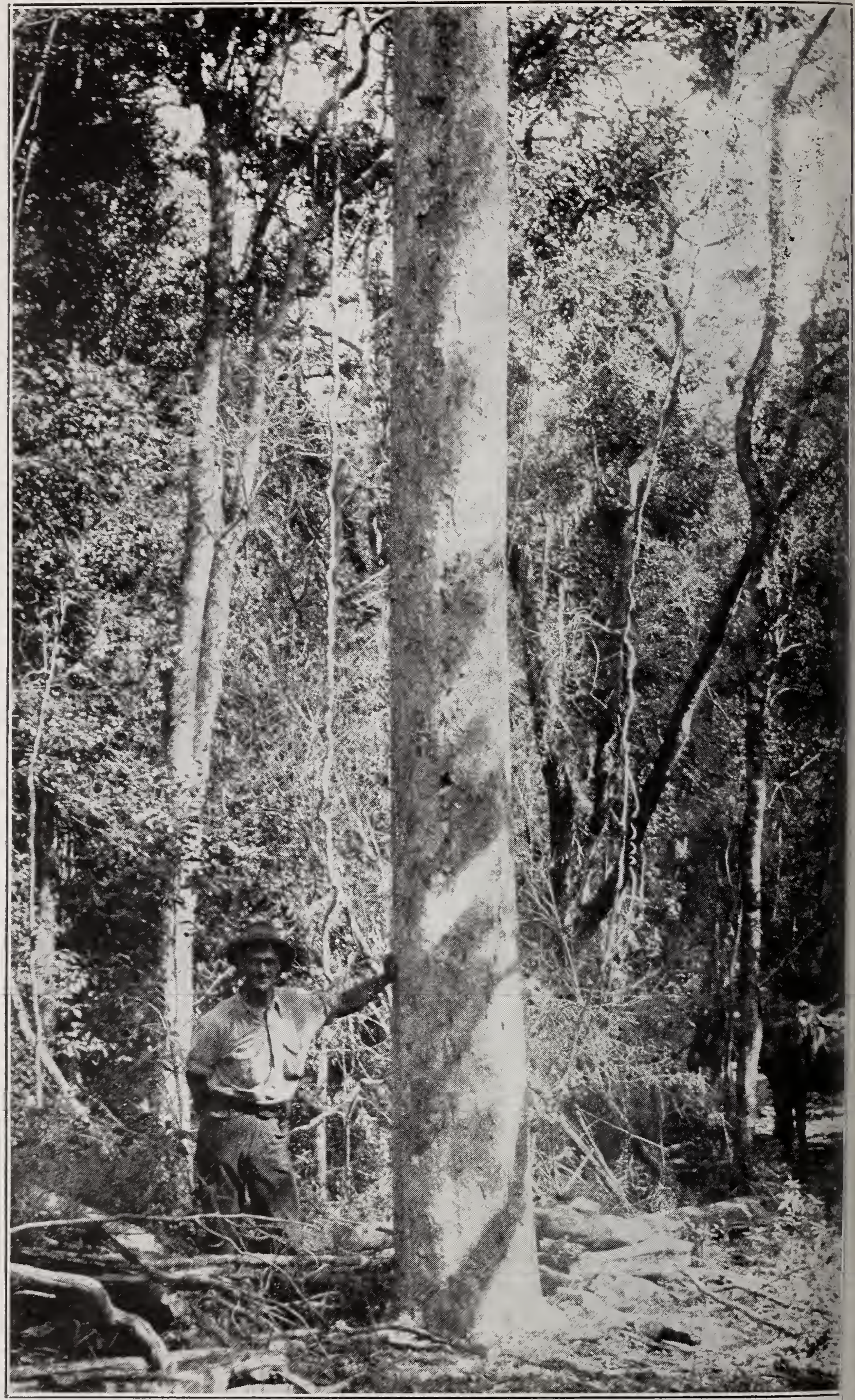


Fig. 106.—Broad-leaved Leopard Tree (*Flindersia collina*). Nanango, abou 26.6° S. The prominent rounded depressions of the bark are more in evidence on th darker side of the stem. The bright illumination on the right side has obliterated th detail.

(*Photo.: W. D. F.*

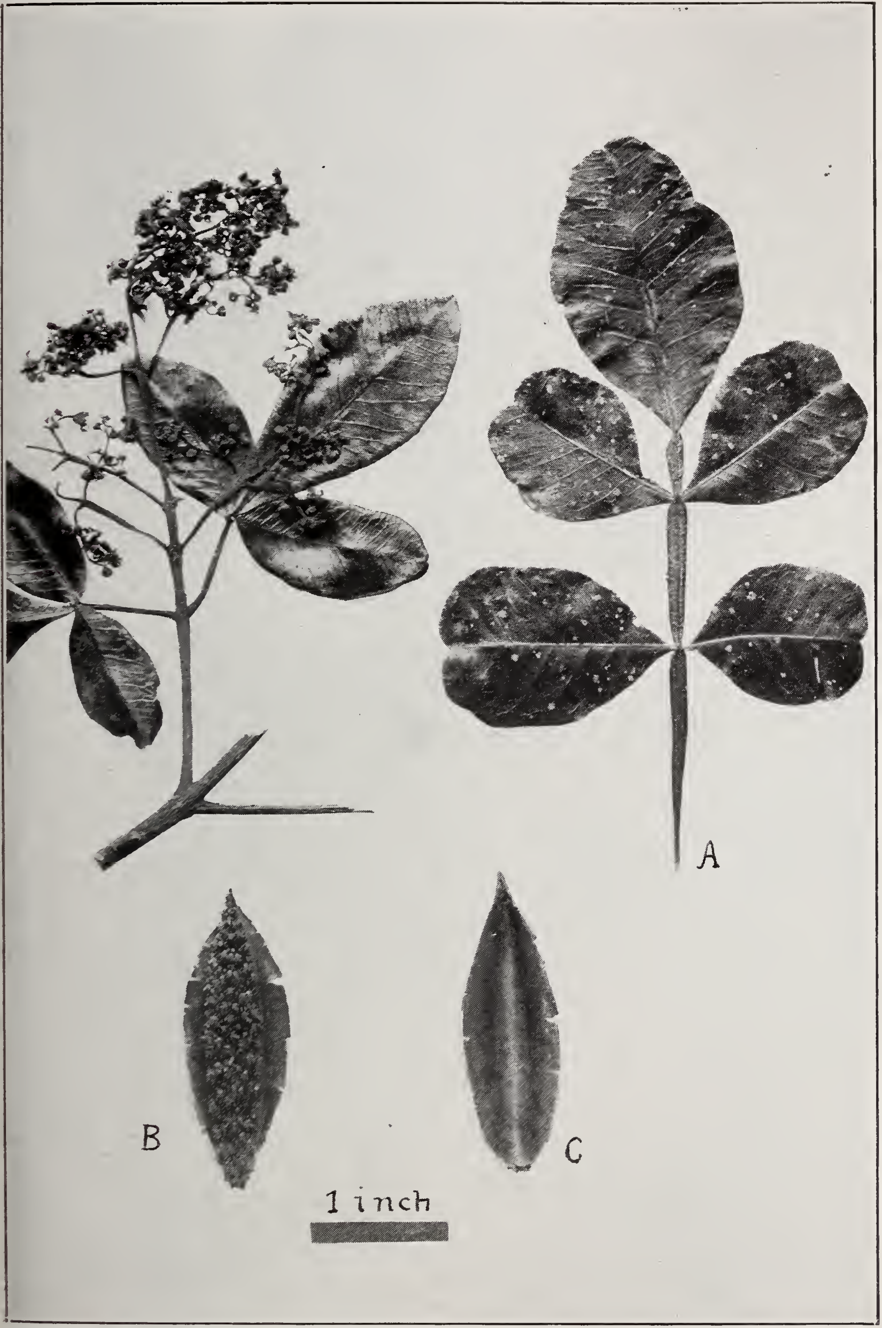


Fig. 107.—Broad-leaved Leopard Tree (*Flindersia collina*). A, seedling or coppice leaf; B, capsule valve, showing back or exterior; C, capsule valve, showing interior. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

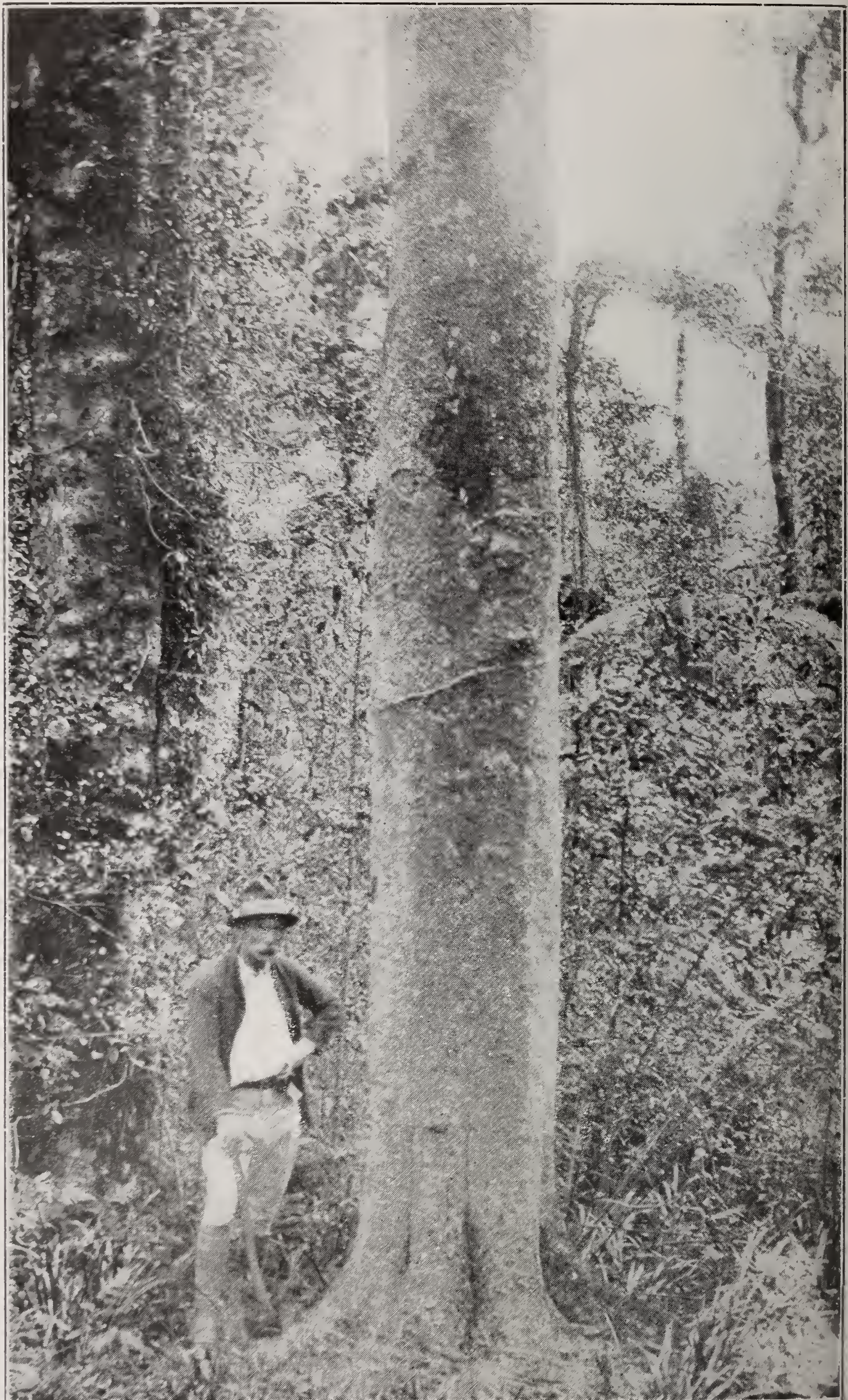


Fig. 108.—SOUTHERN GHITTOE (*Halfordia drupifera*). Roberts Plateau, Macpherson Range, about 28.3° S. (*Photo.: W. D. F.*)

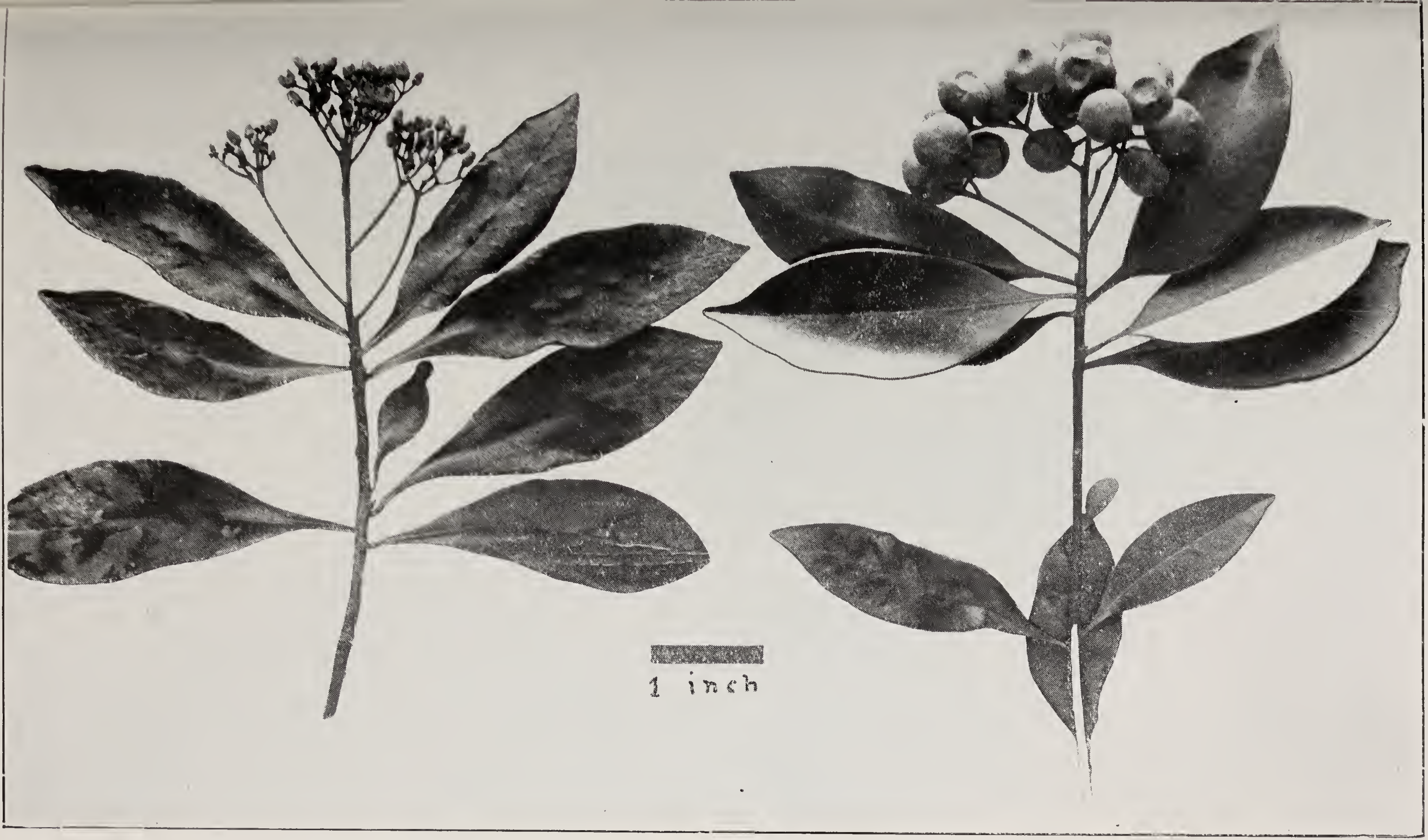


Fig. 109.—Southern Ghittoe (*Halfordia drupifera*). Dried flowering branchlet on left; fresh fruit-bearing branchlet on right.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Distribution.—Australia and New Caledonia. Coastal scrubs from Cape Byron, N.S.W. (F.v.Mueller), to Fraser Id., Queensland. Small trees are often found in sandy soils close to beaches.

Uses.—The wood is tough and flexible and is used for making the tips of fishing-rods. It is pale or yellowish in colour, fine-grained, hard, and heavy.

Reference.—*Halfordia drupifera* F.v. Mueller, Fragmenta Phytographiae Australiae, vol. 5, p. 43, 1865–1866.

Halfordia scleroxyla F.v.M. Ghittoe of North Queensland. Large tree, very closely resembling *H. drupifera* (*see* Fig. 109). Differs from *H. drupifera*, according to F. v. Mueller, in having red fruit and the radicle of the embryo slightly longer. Specimens of the two species in Queensland Herbarium are scarcely separable. *H. scleroxyla* recorded from Lismore, N. S. Wales. Wood used for fishing-rod tips.—Rockingham Bay (F.v.M.) to Cape York Peninsula.

13. MICROMELUM.

Micromelum pubescens Blume. Small tree, leaves alternate, pinnate, consisting of 7–9 leaflets. Each leaflet has appearance of an ordinary leaf, margins toothed, base unequal-sided, hairy or almost hairless, 1½–3½ in. long, 2–3 times as long as broad. Berry smooth, yellow or red, egg-shaped, ¼–⅜ in. long, containing 2 or 1 seed.—Brisbane to Cape York ; N. S. Wales (Maid. and Betche) ; Papua ; Tropical Asia.

14. CITRUS.

Citrus australis Planch. and **Citrus australasica** F.v.M. are small trees or shrubs. Leaves alternate, often with rigid spines in their forks (axils). Leaves up to 1½ in. long, sometimes almost as broad as long, but often very narrow. *Citrus australasica* has an elongated fruit 1–3¾ in. long. Fruit of *C. australis* are globular and 1–1½ in. diameter. Both fruits have a lemon-like flavour accompanied by a taste of a turpentine nature. *C. australis* : Brisbane to Gympie ; New South Wales (Maid. and Betche). *C. australasica* : Clarence River (Benth.) to Brisbane.

Family SIMARUBACEAE.

Ailanthus malabarica A. DC. White Bean, White Siris. Figs. 110 and 111.

Derivation.—Ailanthus, the Chinese name for the first species of the genus, *Ailanthus glandulosus*, the Tree of Heaven ; malabarica, after Malabar, a part of the western coast of India.

Description.—A tree attaining over 100 ft. in height and a stem diameter of 2 ft. Stem not buttressed. Bark grey or brown, often very finely scaly, exuding an almost colourless resin when wounded ; when cut, yellowish brown, measuring ⅝ in. thick on a tree with a stem diameter of 1 ft. 10 in. Young shoots and sometimes the underside of the leaves (leaflets) downy with fine hairs. Branchlets thick, marked by the scars of the fallen leaves. Leaves alternate, pinnate, consisting of 15–60 leaflets. Each leaflet has the appearance of an ordinary leaf, is borne on a stalklet $\frac{1}{12}$–⅕ in. long, is curved or sickle-shaped and very unequal-sided, drawn out into a long blunt point at the apex ; upper surface glossy, under surface dull ; the midrib, lateral nerves, and some fine net-veins visible on the underside but not so plain above ; measurement of leaflet blade, 2–5 in. long, 3–5 times as long as broad. Flowers in slender inflorescences (narrow panicles) situated in the forks of the upper leaves, the panicles 1½–3 in. long in our specimens. Only male flowers seen ; they are about ¼ in. in diameter when expanded ; the lowermost part, the calyx, divided nearly to the base into 5 narrowly triangular lobes each measuring less than $\frac{1}{20}$ in. long. On the inner side of the calyx are 5 petals each about ⅛ in. long. On the inner side of the petals are about 10 stamens, with fine, hair-like stalks (filaments) about ⅕ in. long each bearing a minute, yellow, almost oval anther at its summit. Fruit consisting of 1–5 flattened bodies (samarae), each measuring about 2 in. long and nearly ¾ in. wide, with the seed situated about the middle in a circular thickened part. Flowering period : December.

Distribution.—Coastal scrubs of Queensland as far north as Bowen and as far inland as Mt. Perry (about 60 miles inland from Bundaberg). C. Moore (Handbook of Flora of N. S. Wales, p. 51) records it for northern brush forests of N. S. Wales The species is also distributed in India, Ceylon, and Cochin China (A. W. Bennett).

Uses.—The timber could be used indoors for purposes in which lightness is required. The bark produces a resin which Dr. Lauterer investigated ; he states : It makes a good ointment for chronic ulcers, used pure or mixed with wax and lard, but fresh cuts are not to be treated with the resin on account of its acrid oil. Technically, the resin might be applied for softening too hard and too quickly drying alcoholic varnishes, especially for tin and smooth metal surfaces where a brittle varnish is liable to fall off after drying in the sun. (See footnote in F. M. Bailey's Queensland Flora, i., p. 217.) The Indian tree has medicinal properties, and Dymock (Vegetable Materia Medica of Western India) states: "The bark has a pleasant and slightly bitter taste and is given in cases of dyspepsia and is also considered a valuable tonic and febrifuge. Reduced to powder, mixed with milk, and strained the resin is given in small doses in dysentery and also in bronchitis, and is reputed to be an excellent remedy, chiefly owing to its balsamic properties. The peculiar consistency of the resin would enable it to be used as a substitute for Venice turpentine for many purposes."

Botanical.—Mr. C. T. White and the writer are unable to separate the Australian tree, which previously has been known as *Ailanthus imberbiflora*, from the Indian *Ailanthus malabarica* by any definite character, and the Indian name is therefore retained.

References.—*Ailanthus malabarica* A. de Candolle, Prodromus Systematis Naturalis Regni Vegetabilis, vol. ii., p. 89, 1925; *Ailanthus imberbiflora* F. v. Mueller, Fragmenta Phytographiae Australiae, vol. iii., p. 42, 1862–1863.

Family BURSERACEAE.

Protium australasicum T. A. Sprague. Mango Bark, Carrot-wood, Brown Cudgerie. Figs. 112 and 113.

Derivation.—Protium, derivation obscure; *australasicum* Latin, Australasian.

Description.—A tree attaining about 90 ft. in height and a stem diameter of about 2 ft. Stem not prominently flanged at the base. Bark greyish brown, marked by roundish depressions from which pieces or scales of the bark have been shed, and by minute pustules; when cut, reddish brown towards outside, paler inwards, measuring ½ in. thick on a tree with a stem diameter of about 2 ft. The freshly cut bark has an odour like that of a mango. All parts hairless. Branchlets brown, marked by minute brown protuberances (lenticels). Leaves alternate, pinnate, consisting of 3-5 or more rarely 7 leaflets. Each leaflet has the appearance of an ordinary simple leaf; the lateral leaflets (which are in opposite pairs) are borne on stalklets ¼–⅜ in. long and the terminal odd ones on stalklets ¾–1 in. long. The leaflets are elliptical in shape, protracted into a blunt point (acuminate) at the apex and have wavy margins. The midrib, lateral nerves, and a few net-veins are visible on the upper side and more conspicuous and raised on the under side. Measurement of blade of leaflets, 3–4½ in. long and 2–3 times as long as broad. Flowers deep red in colour, arranged in inflorescences (panicles) at the ends of branchlets or in the forks of the uppermost leaves, the panicles mostly shorter than the leaves and with narrow raceme-like branches. Individual flowers about ⅕ in. in diameter when expanded, stalkless, in groups of 2–4 on very short branches of the inflorescence. The outermost part of the flower, the calyx, cup-shaped, about $\frac{1}{16}$ in. in diameter, its rim divided into 3 obtuse lobes which are egg-shaped (ovate) in outline. On the inner side of the calyx are the red petals, 3 in number, each oval in outline and measuring about $\frac{1}{10}$ in. long. Stamens 6, about half as long as the petals, inserted on the outside of the disk, the anthers oval, heart-shaped at the base, and about as long as the filaments. Disk flattened, obscurely lobed on the margins. Ovary very minute in the flowers examined. Fruit fleshy on the outside, blue or purple, containing a fairly hard "stone" oval or angular in shape, about ⅜ in. long, containing 3–4 cells only 1 or 2 of which are fully developed and contain seeds. Mature seeds 1 in each cell, ¼–⅓ in. long. Flowering period: November. Fruiting period: March and April.

Distribution.—Yandina, North Coast Line, to Eungella Range, 45 miles westward of Mackay; Fraser Island. Confined to Queensland.

Uses.—The wood should be useful for cabinet-making and for general indoor fittings.

References.—*Protium australasicum* T. A. Sprague in Kew Bulletin, p. 370, 1912; *Bursera australasica* F.M.Bailey, Botany Bulletin No. v. (Bulletin No. 18, Dept. Agriculture and Stock, Brisbane), p. 8, 1892.

Family MELIACEAE.

- Stamens 4–6, free and not united in a tube .. .. 1. *Cedrela.*
- Stamens 8 or 10, united in a tube which bears the anthers near the rim.
  - Disk cup-shaped and enclosing the ovary .. .. 3. *Dysoxylum.*
  - Disk not cup-shaped and not enclosing the ovary.
    - Leaves bi- or tri-pinnate, leaflets toothed .. .. .. 2. *Melia.*
    - Leaves pinnate, leaflets not toothed.
      - Fruit capsular, 3- or 2-celled.
        - Fruit with 1 seed in each cell, arillus apparently absent .. 4. *Amoora.*
        - Fruit mostly with 2 seeds in each cell; seeds half imbedded in an arillus .. .. 5. *Synoum.*
      - Fruit globose, fleshy and indehiscent, inner hard part with 2–4 cells .. .. 6. *Owenia.*

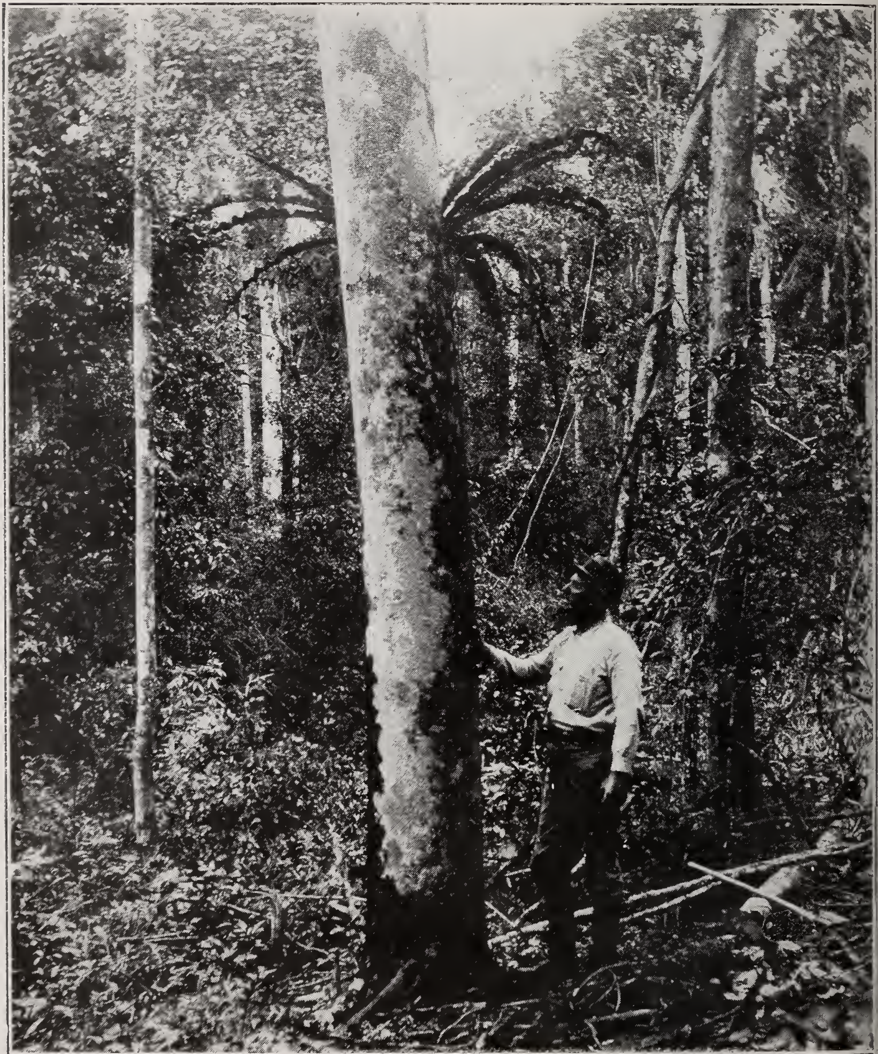


Fig. 110.—White Bean (*Ailanthus malabarica*). Imbil, about 26.4° S. A Bird's Nest Fern (*Asplenium nidus*) is shown on the upper part of the stem. The finely scaly character of the bark is somewhat in evidence on the upper part of the stem.

(*Photo.: W. D. F.*)

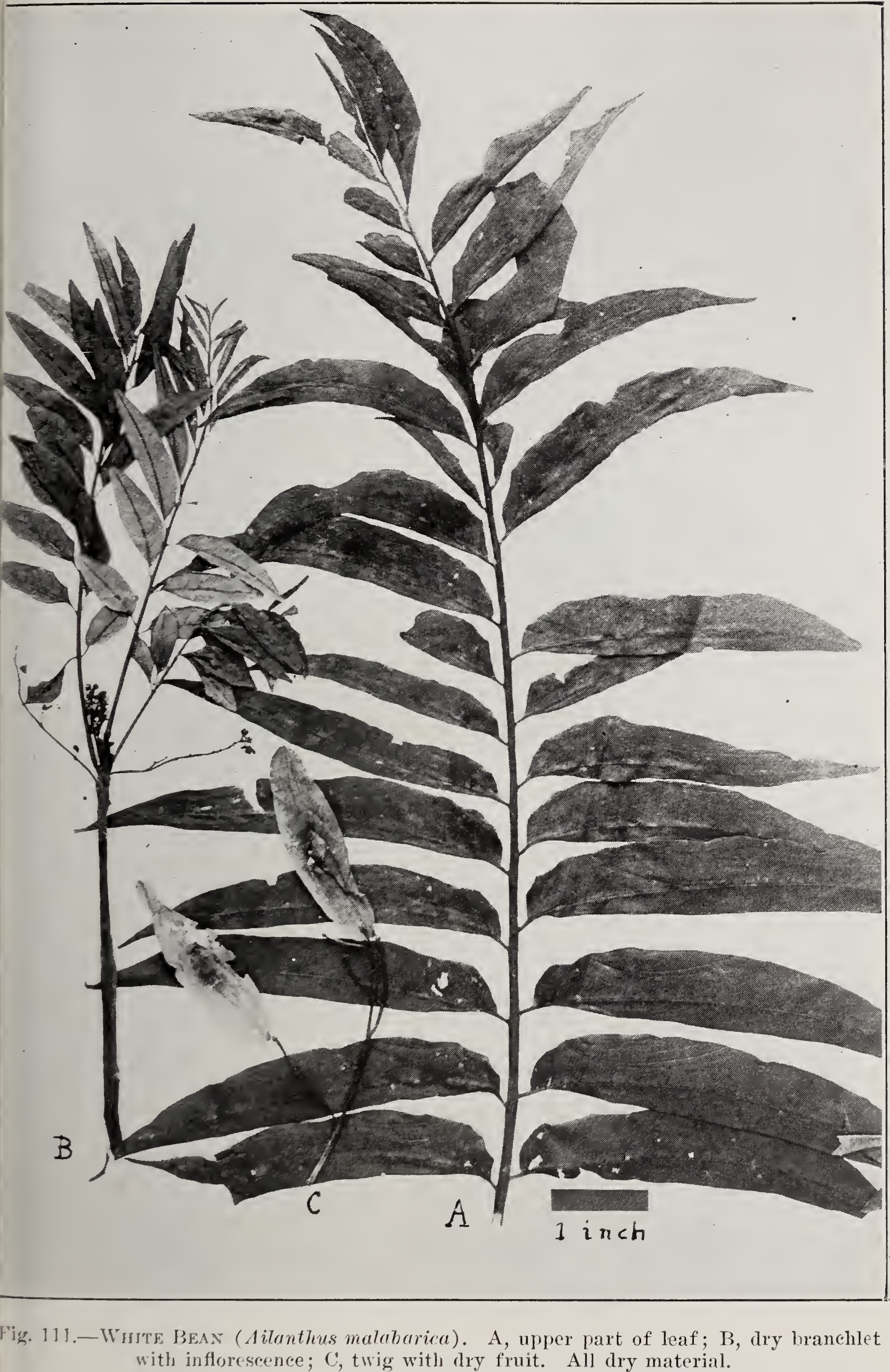


Fig. 111.—White Bean (*Ailanthus malabarica*). A, upper part of leaf; B, dry branchlet with inflorescence; C, twig with dry fruit. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

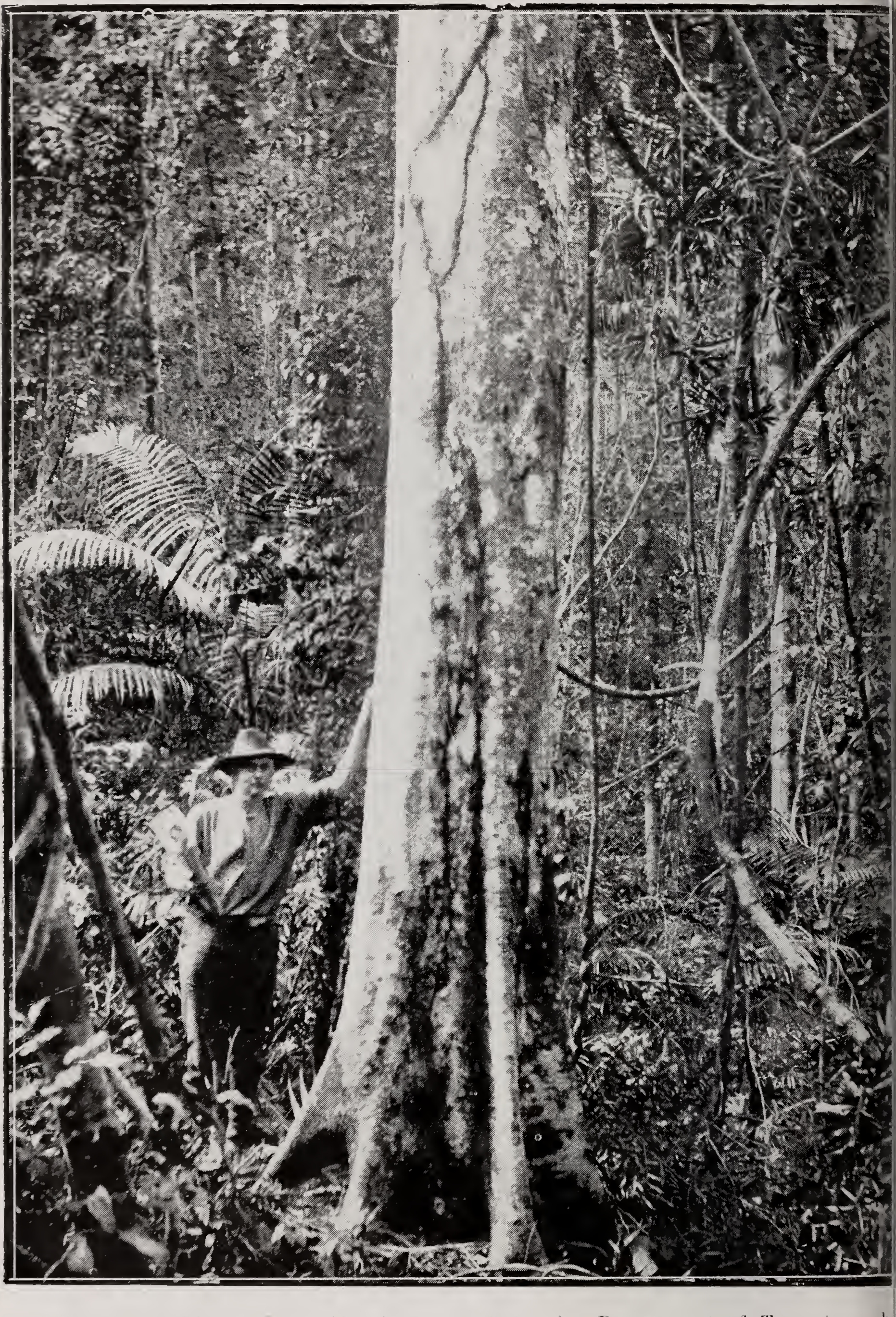


Fig. 112.—Mango Bark (*Protium australasicum*). Ranges east of Traveston, ab t 26.3° S. Bangalow Palm (*Archontophoenix Cunninghamii*) on left; Lawyer Vine (*Calam s Muelleri*) on upper right.

(*Photo.: W. D. F.*)

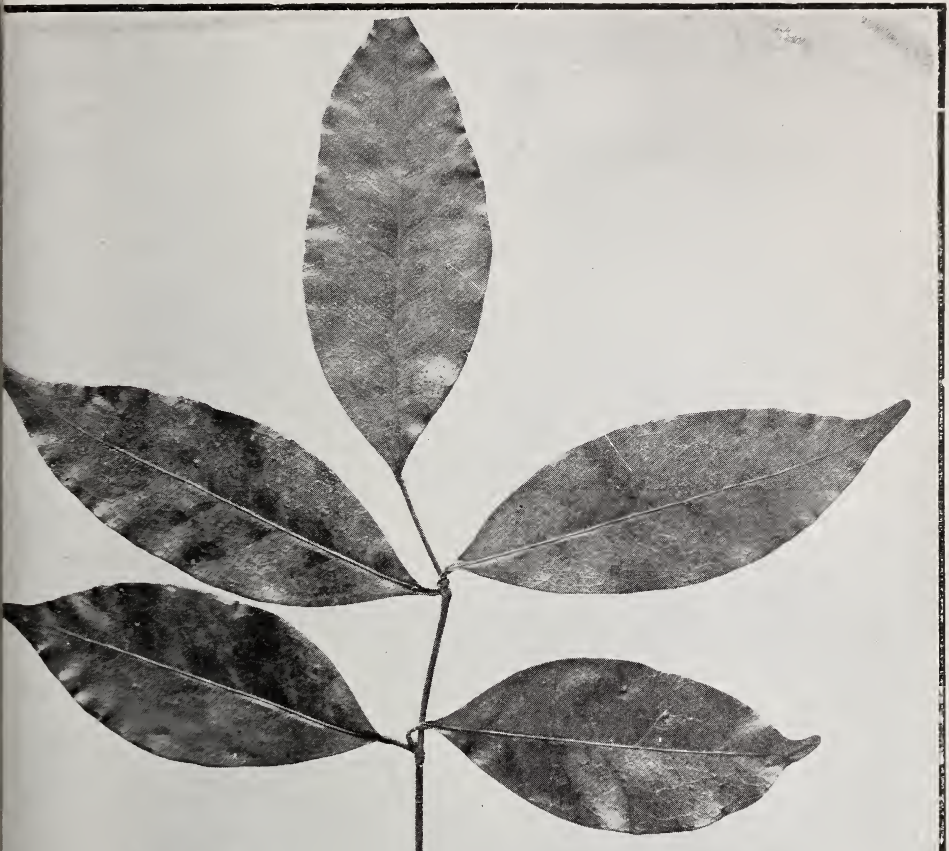


Fig. 113.—Mango Bark (*Protium australasicum*). Branchlet, bearing inflorescence. , twig bearing dry fruit. The leaflet on right shows underside. The inch scale applies to ll figures. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

1. CEDRELA.

Cedrela Toona Roxb., var. **australis** C. DC. Red Cedar. Figs. 114, 115, 116.

Derivation.—Cedrela from Latin *cedrus* = Greek *kedros*, the cedar; Toona from "Toon" the Indian name: *australis* Latin, southern.

Description.—A large deciduous tree attaining 140 ft. in height and a stem diameter of 6 ft. Stem buttressed at the base, at least in tropical and subtropical areas. Bark grey or brown, scaly, shed in oblong pieces. When cut through the bark is seen to have an outer red layer and an inner whitish one and measures $\frac{1}{4}$ in. thick on a tree with a stem diameter of $2\frac{1}{3}$ ft. Sapwood yellowish white. Heartwood of a rich red colour, fragrant. Leaves alternate, pinnate, consisting of 3–8 pairs of leaflets. Each leaflet has the appearance of an ordinary leaf, is borne on a stalklet about $\frac{1}{4}$ in. long, is unequal-sided at the base and often protracted into a long point at the apex, and measures from $1\frac{1}{2}$–4 in. long and is 2–3 times as long as broad. Flowers fragrant, in a large panicle at the ends of the branchlets. Individual flowers about $\frac{1}{6}$ in. long. The lowest part of the flower, the calyx, is 5-lobed and scarcely $\frac{1}{16}$ in. long. On the inner side of the calyx are the 5 oval petals measuring about $\frac{1}{6}$ in. long. On the inner side of the petals and shorter than them are the stamens varying in number from 4–6. The ovary (in the centre of the flower) tapers at the apex into a style which is crowned by a round flat stigma. Capsule dry, from $\frac{3}{4}$–1 in. long, splitting open in 5 valves exposing the seeds, which are contained in 5 grooves of a central column. Seeds 4–5 in each groove or cell in our specimens, $\frac{1}{2}$–$\frac{3}{4}$ in. long, thin, winged at each end. Flowering period: September–October.

Distribution.—Coastal scrubs from Ulladulla, south of Sydney, N.S.W. (J. H. Maiden), to Atherton, North Queensland. On account of the great demand for the timber, the trees are now rare except in some of the less accessible scrubs of North Queensland.

Uses.—The wood is red in colour and often highly figured when cut to show the growth rings to advantage. It is durable and seasons quickly. It has been a popular furniture wood in the past when the trees were more plentiful. Pores of wood single and in radial rows of 2–5 pores to each row; frequently there are concentric rings of disconnected large pores at the beginning of each zone of growth (annual ring ?); the soft tissue occurs at the junction of the zones of growth in the form of concentric lines which are often interrupted by the concentric rows of large pores. The figure of the wood is caused by the concentric rings of large pores; when they are not strongly developed the figure is not prominent. The tree is sometimes cultivated for shade and ornamental purposes. The growth of the young trees is greatly hindered or in many cases made almost impossible by the depredations of the Red Cedar Tip Moth (*Hypsiphyla robusta*).

Reference.—Cedrela Toona Roxburgh, var. *australis* C. de Candolle in Records of the Botanical Survey of India, vol. iii., No. 4, p. 368, 1908.

2. MELIA.

Melia Azedarach Linn. var. **australasica** C. DC. White Cedar, Tulip Cedar. Fig. 117.

Derivation.—Melia Greek, the ash (referring to the resemblance of the leaves to those of the Ash (*Fraxinus*); Azedarach from *azadaracht*, the Arabic name of the tree.

Description.—A large deciduous tree attaining a height of 150 ft. and a stem diameter of 4 ft. Stem not prominently buttressed. The bark is dark in colour and very prominently furrowed (fissured). When cut through the bark is seen to be red or reddish brown in colour and $\frac{1}{4}$–$\frac{1}{2}$ in. thick on a tree with a stem diameter of 1 ft. Wood light brown, light in weight. Leaves alternate, twice or less frequently thrice pinnate, with numerous leaflets. Each leaflet has the appearance of an ordinary leaf, is borne on a short stalklet about $\frac{1}{12}$ in. long or is stalkless, has prominently toothed margins and often a long narrow point; measurement 1–3 in. long, 2–3 times as long as broad. Flowers in large panicles springing from the forks (axils) of the leaves. The individual flowers are lilac in colour and measure about $\frac{3}{4}$ in. in diameter when fully out. The lowermost part of the flower is the calyx which is 5- or 6–lobed and measures about $\frac{1}{12}$ in. long. On the inner side of the calyx are the 5 or 6 narrow coloured petals each measuring about $\frac{2}{3}$ in. long. On the inner side of the petals is the staminal tube (united stamens), which is about three-quarters of the length of the petals and bears at its summit 10 or 12 minute teeth, and on the inner side of the summit 10 or 12 minute anthers (pollen-containing cells). The ovary is enclosed in the staminal tube and tapers into a style about as long as the staminal tube. Fruit yellow, oval, about $\frac{1}{2}$ in. or more in length; the pulp surrounding a hard "stone" with 5 or 6 longitudinal grooves and containing 5 cells, each cell enclosing 1 seed about $\frac{3}{10}$ in. long. Flowering period: September–October.

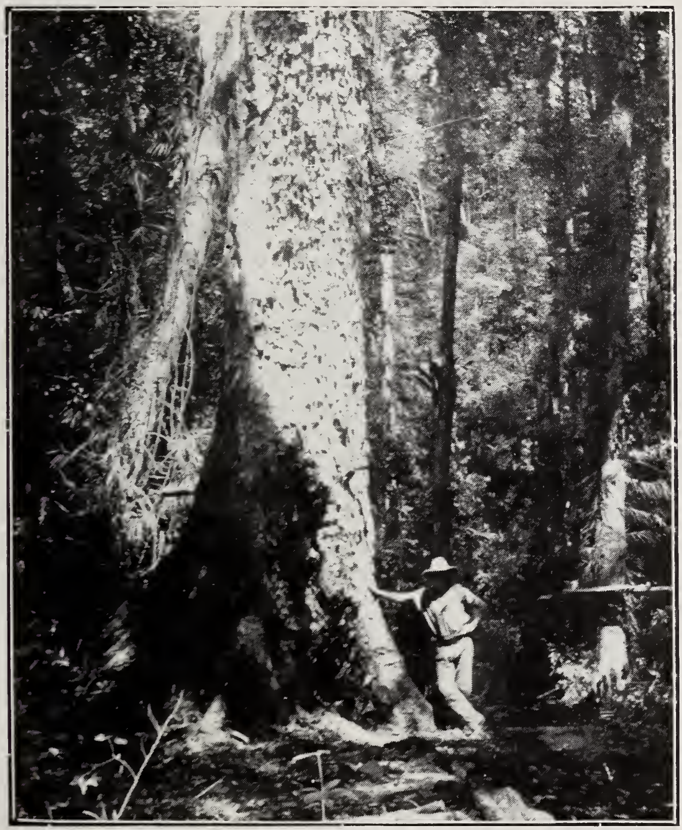


Fig. 114.—Red Cedar (*Cedrela Toona* var. *australis*). Eungella Range, about 21° S. The climbing Pandanaceous plant (*Freycinetia excelsa*) is conspicuous to left of tree stem and on extreme right of picture.

(*Photo.: W. D. F.*)

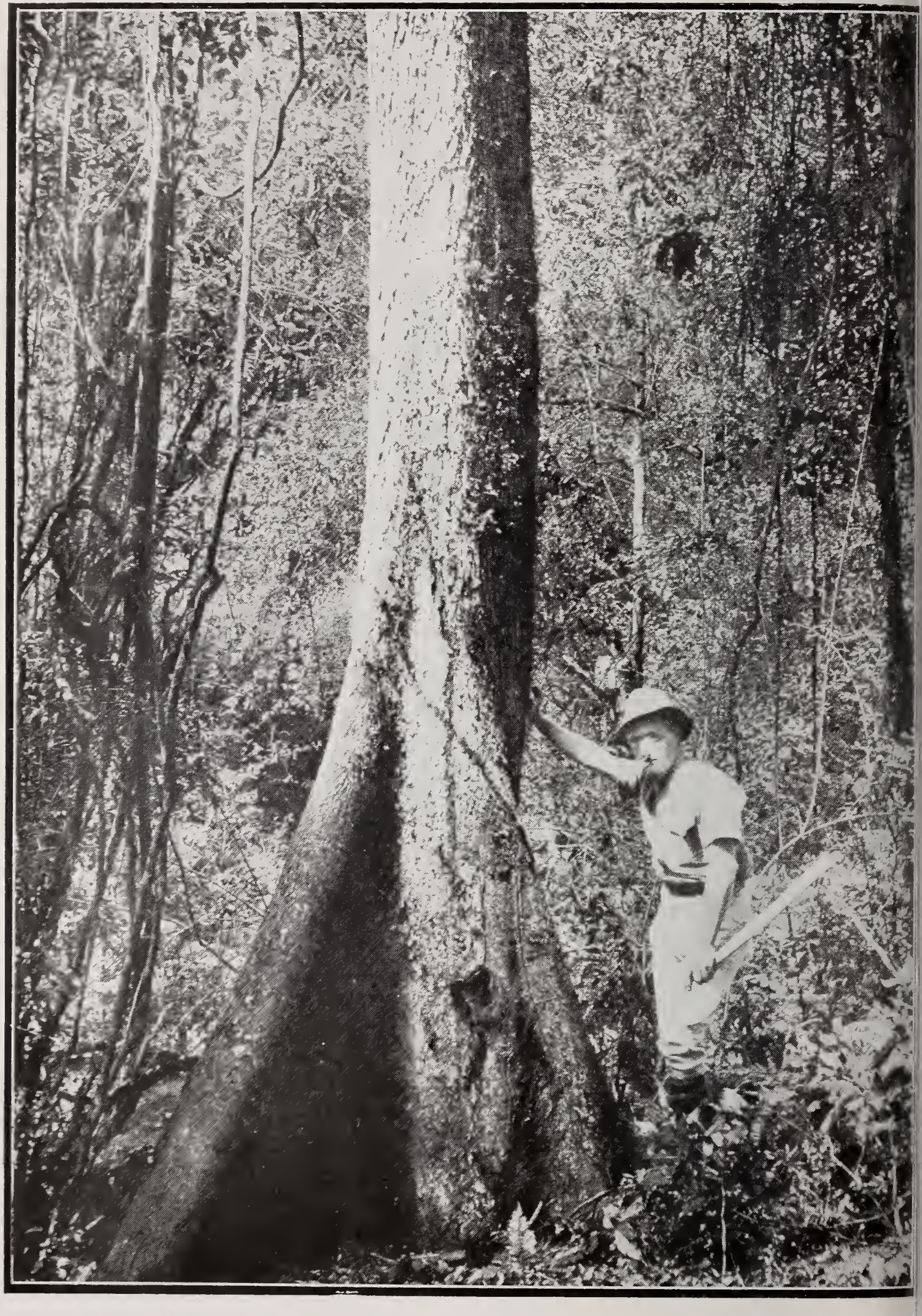


Fig. 115.—Red Cedar (*Cedrela Toona* var. *australis*). Ranges east of Emu Vale, near Killarne about 28.4° S. The scaliness of the bark is evident in the upper part of stem.

(*Photo.: W. D. F.*)

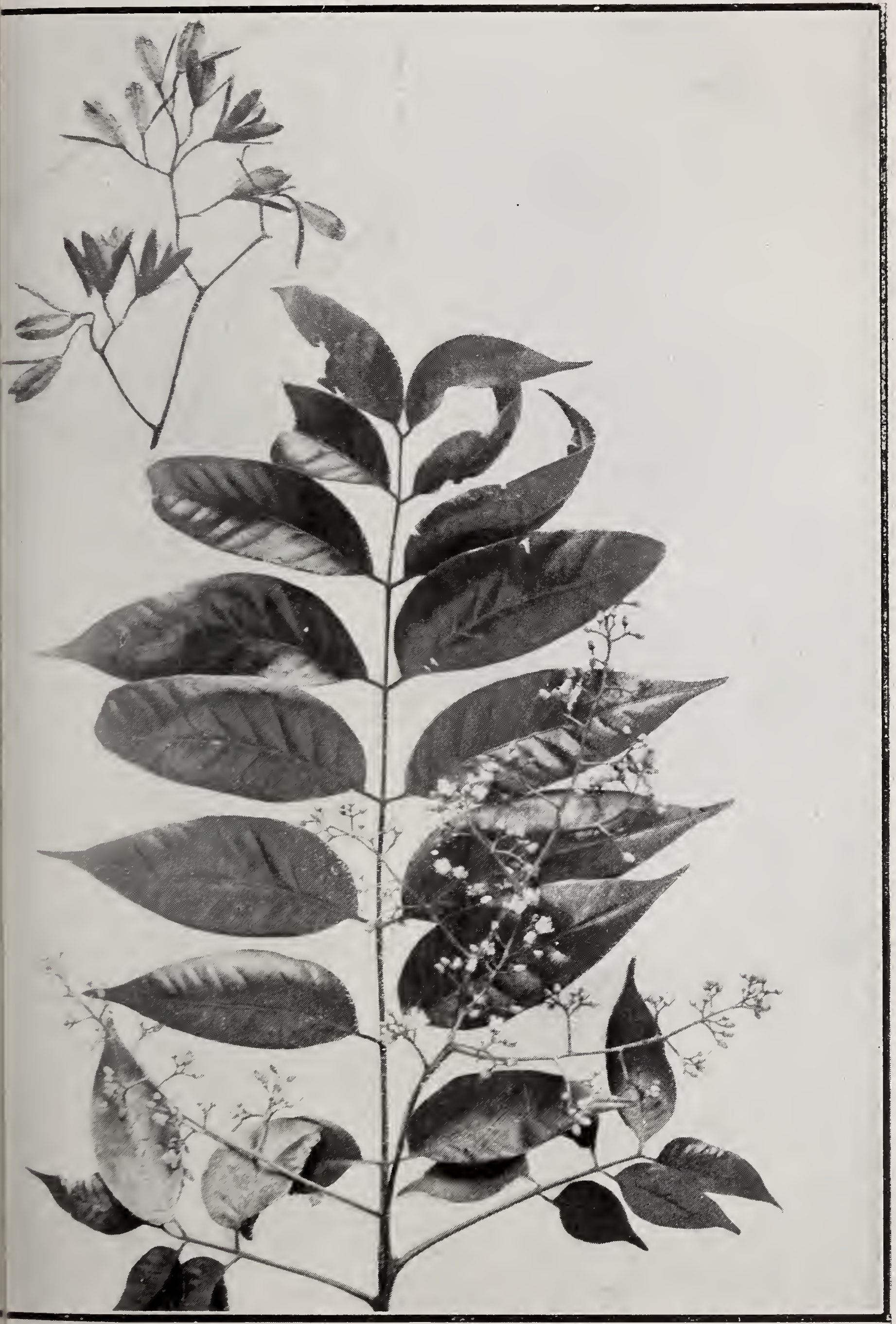


Fig. 116.—Red Cedar (*Cedrela Toona* var *australis*), about one-half natural size. B nchlet, bearing inflorescences in lower part; capsule-bearing twig on upper left. From C. T. White's Text-book of Forest Botany. Fresh material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

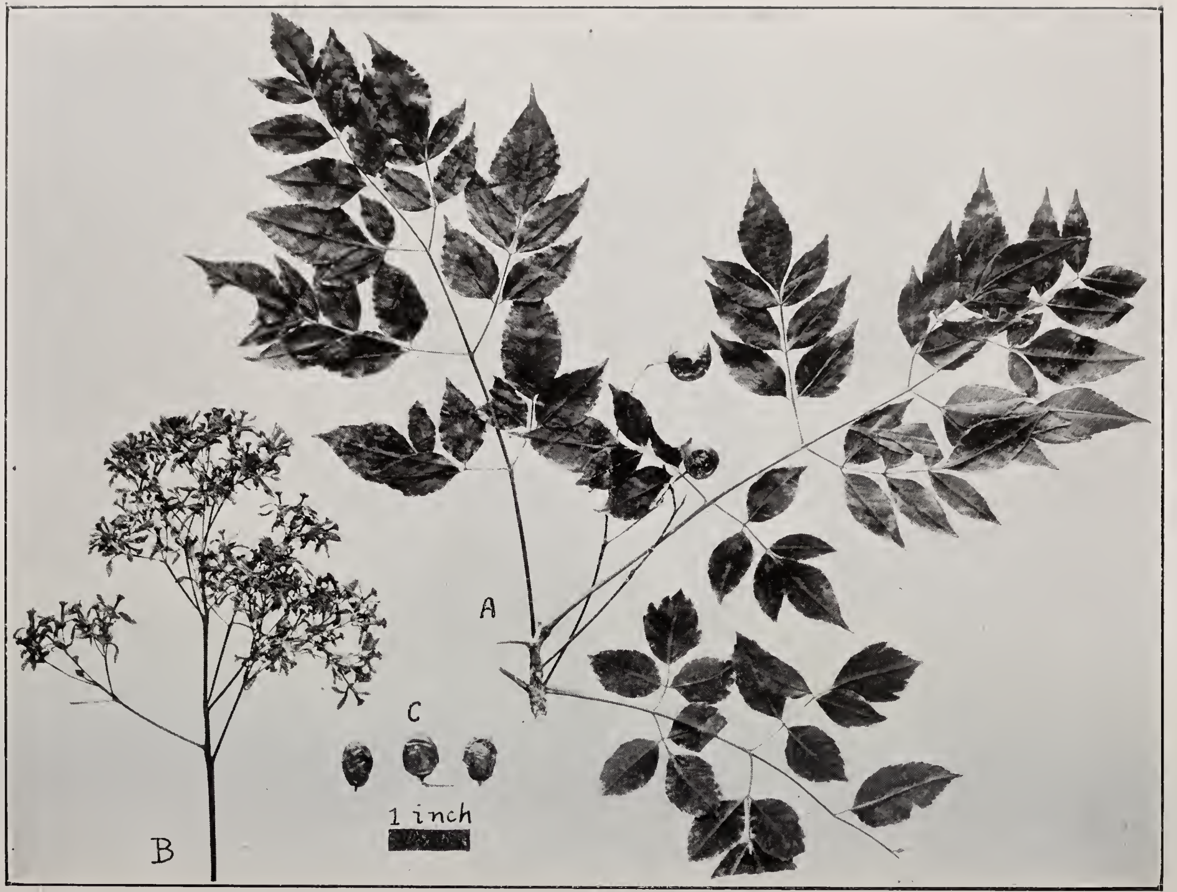


Fig. 117.—White Cedar (*Melia Azedarach* var. *australasica*). A, fruit-bearing branchlet; B, inflorescence (panicle) from the fork of an upper leaf; C, fruit. All in dry state.

Distribution.—Limited to Australia and New Guinea. Coastal scrubs of North and South Queensland and Northern N. S. Wales. Mr. J. H. Maiden (Forest Flora of N. S. Wales, iii., p. 98) states that it extends northwards from a little north of Sydney.

Uses.—The highly figured timber is a useful cabinet wood. It is too prominently figured for those who prefer less obvious markings in their furniture woods. Pores of wood single and sometimes in groups of 2–4 pores, larger pores forming concentric rings at beginning of zones of growth ; soft tissue between the pores forming the concentric rings and in wavy or tail-like lines often connected with the scattered pores. The concentric rings of large pores impart to the wood its strongly marked figure.

Poisonous Properties.—The yellow berries are poisonous to pigs which eat them.

References.—*Melia Azedarach* Linnaeus, var. *australasica* C. de Candolle, Monographiae Phanerogamarum, vol. i., p. 452, 1878. *Melia composita* Willdenow.

3. DYSOXYLUM.

Dysoxylum Becklerianum C. DC. Imperfectly known tree. Leaves similar to those of *D. Fraseranum* (*see* Fig. 120), but the leaf rhachis and midrib of the leaflets are hairy. The branches of the inflorescence are hairy. Flowers similar to those of *D. Fraseranum.*—Clarence River (Maiden) to Gympie.

Dysoxylum Fraseranum Benth. Rosewood, Rose Mahogany. Figs. 118, 119, 120.

Derivation.—Greek *dysosmos*, ill-smelling ; *xylon*, wood (alluding to the disagreeable smell of some of the species) ; Fraseranum, after Charles Fraser.

Description.—A large tree attaining a height of 130 ft. and a stem diameter of 5 ft. Stem often somewhat flanged at the base but not so deeply buttressed as in trees like the Carrabean (*Sloanea Woollsii*). Bark grey, scaly, shed in oblong or roundish flakes ; when cut, whitish yellow, fragrant ; the outermost layer when peeled off often shows a brown-coloured inner surface on the strip peeled off ; measurement of bark, $\frac{3}{8}$ in. thick on a tree with a stem diameter of 4 ft. Sapwood white, fragrant. Leaves alternate, pinnate, consisting of 5–10 leaflets. In the typical form the full-grown leaves are hairless. The leaf-stalks measure from 1–2$\frac{1}{2}$ in. in length between their insertion on the branchlets and the lowermost pair of leaflets. Leaflets on stalklets measuring from $\frac{1}{8}$–$\frac{1}{4}$ in. long, the terminal odd one when present on a much longer stalklet. Each leaflet has the appearance of an ordinary leaf, is elliptical in outline, often contracted into a short blunt point at the apex, midrib and lateral nerves alone prominent on both surfaces, small transparent dots (presumably oil-cells), round or oblong, are often visible when the leaflets are held up to the light ; lateral nerves often thickened where they join the midrib on the underside ; measurement of leaflets 3–6 in. long, about 3 times as long as broad. Flowers in inflorescences (panicles) springing from the forks of the upper leaves, the inflorescences generally shorter than the leaves. Flower-stalks distinct, slightly downy. Individual flowers over $\frac{1}{3}$ in. in diameter when expanded, slightly hairy in most of their parts. The lowermost part, the calyx, small and cupular, about $\frac{1}{8}$ in. in diameter. On the inner side of the calyx are 4 seldom 5 petals each measuring about $\frac{1}{4}$ in. long and adhering to the staminal tube towards the base. On the inner side of the petals is the staminal tube which is shortly cylindrical, measures about $\frac{1}{6}$ in. long, and bears 8–10 small teeth at its rim ; inside of the rim and between the teeth are inserted 8–10 anthers. On the inner side of the staminal tube and less than half its length is the cup-shaped disk enclosing the ovary, which tapers into a slender style slightly protruding from the staminal tube. Fruit globular or somewhat pear-shaped, $\frac{3}{4}$–1$\frac{1}{2}$ in. in diameter, containing 3 or 4 cells, each cell containing 1 or 2 large red-coated seeds.

Distribution.—Common in the scrubs on the Macpherson Range, National Park, ranges about Killarney, on Tambourine Mountain, and on the Mistake Range. We have no record of the typical species north of Brisbane. N. S. Wales as far south as Wyong near the Hawkesbury River (J. H. Maiden, Forest Flora of N. S. Wales, vol. iii., p. 35, 1908).

Uses.—The fragrant red timber is very durable and ornamental and should be in demand for cabinet-work. It is reputed to be unsuitable for instrument cases because brass lacquered instruments become coated with a resinous substance when packed in cases made of the timber (*see* J. H. Maiden's work quoted above, p. 33).

References.—*Dysoxylum Fraseranum* Bentham, Flora Australiensis, vol. i., p. 381, 1863. The generic name is sometimes spelt "Dysoxylon." *Dysoxylum Lessertianum* Bentham, Flora Australiensis, vol. i., p. 382, 1863, is a synonym of *D. Fraseranum* according to J. H. Maiden.

Dysoxylum Muelleri Benth. (?) The tree shown in Fig. 121 is generally known as Red Bean. As the fruit of the tree was not collected, some doubt exists as to which species of Dysoxylum it belongs. The bark when cut has a strong onion-like odour. The sapwood when fresh has a similar odour. The leaves are pinnate and consist of 15–17 large leaflets which are often hairy on the underside and are attached to a rhachis which is often hairy. The leaflets are very unequal-sided at the base and measure 4–6 in. long and 2–3 times as long as broad; there are 7–8 principal lateral nerves on each side of the midrib, and tufts of hairs are situated on the underside at the junctions of these nerves with the midrib; the stalklets of the leaflets measure $\frac{1}{8}$–$\frac{1}{6}$ in. long, and the apices of the leaflets are suddenly narrowed into a very prominent long point at the apex. The lowermost leaflet of the leaves is situated on the main stalk at a distance of 4–6 in. from the insertion of the main stalk on the branchlet. There is a considerable amount of pale or white sapwood in the outer part of the stem, but the inner or heartwood is of a rich red colour. The heartwood is used for furniture-making and indoor work. It is a wood with a fairly good figure, and is firmer in texture than Red Cedar. Until the species of the tree is finally determined its exact range remains in doubt. Leaf specimens and photo. of tree at Kin Kin.

Dysoxylum Muelleri Benth. The following original description by Bentham of this species is quoted from the "Flora Australiensis." A tree of 60 ft. or more, glabrous or nearly so, except the very young shoots and inflorescence. Leaves 1 to 2 ft. long; leaflets 11 to 21, from ovate to almost lanceolate, shortly acuminate, 3 to 6 in. long, very oblique at the base, one side rounded, the other truncate and shorter, almost coriaceous. Panicles pyramidal, $\frac{3}{4}$ to 1 ft. long, much branched and many-flowered. Calyx cupular, $\frac{1}{2}$–$\frac{3}{4}$ line long, pubescent, 4-lobed. Petals 4, nearly glabrous, about 5 lines long, adhering to the staminal tube to about two-thirds their length. Staminal tube truncate and minutely crenulate, hirsute outside. Disk narrow-tubular, nearly half as long as the staminal tube. Ovary hirsute, 4-celled, with 1 ovule in each cell. Fruit only seen very young, soon becoming glabrous. Queensland: Brisbane River, Moreton Bay. N. S. Wales: Clarence River. These localities are given by Bentham. The only specimens in the Queensland Herbarium which conform to Bentham's description are from a tree cultivated in the Botanic Gardens, Sydney. J. H. Maiden (For. Flora N. S. W. vol. 3, pp. 115-117) figures the species. He calls it Red Bean and remarks that the wood is red and that the bark and sapwood have a strong, turnip-like odour when fresh. This peculiar odour is evidently very similar to that noticed in the preceding species tentatively named *Dysoxylum Muelleri* Benth (?).

Dysoxylum rufum Benth. Small or large tree (?). Shoots, young branchlets, underside of leaves clothed with dense rust-coloured hairs. Leaves alternate, pinnate, leaflets up to 19, often broader at base than those of *Dysoxylum Fraseranum* (*see* Fig. 120), often very unequal-sided at base. Fruit globose, almost 1 in. in diameter, covered with dense, rust-coloured, fairly rigid hairs, indistinctly 5-lobed.—Port Macquarie (Benth.) to Gympie.

4. AMOORA.

Amoora nitidula Benth. Incense wood. Up to 60 ft. high and 1 ft. stem diameter in Queensland. According to accounts by J. H. Maiden, up to 120 ft. high and 6 ft. stem diameter in N. S. Wales. Stem not buttressed, bark grey with distant longitudinal often indistinct fissures; somewhat resembling bark of *Tarrietia Argyrodendron*. Wood pale, often with fragrance like Red Cedar. Leaves alternate, pinnate, with 2–6 leaflets. Leaflets 3–5 in. long, 2–3 times as long as broad, venation not prominent. Flowers similar in structure to those of *Dysoxylum Fraseranum* (*see* description) but shorter and without a cup-shaped disk surrounding the ovary. Fruit brown, pear-shaped, 1 in. long, opening in 3 valves; seeds oval, over $\frac{1}{2}$ in. long, bright scarlet, according to J. H. Maiden.—Clarence River (Benth.) to Atherton.

5. SYNOUM.

Synoum glandulosum A. Juss. Scentless Rosewood. The rich red timber without a strong perfume such as that which characterises the Rosewood probably suggested this common name. Red Sycamore. Figs. 122 and 123.

Derivation.—Synoum from Greek *syn*, with; Latin *ovum*, an egg; alluding to the ovules (which develop into the seeds) being joined together in pairs in each cell of the ovary; glandulosum Latin, glandular; alluding to the gland-like tufts of hairs on the underside of the leaflets where the lateral nerves join the midrib.

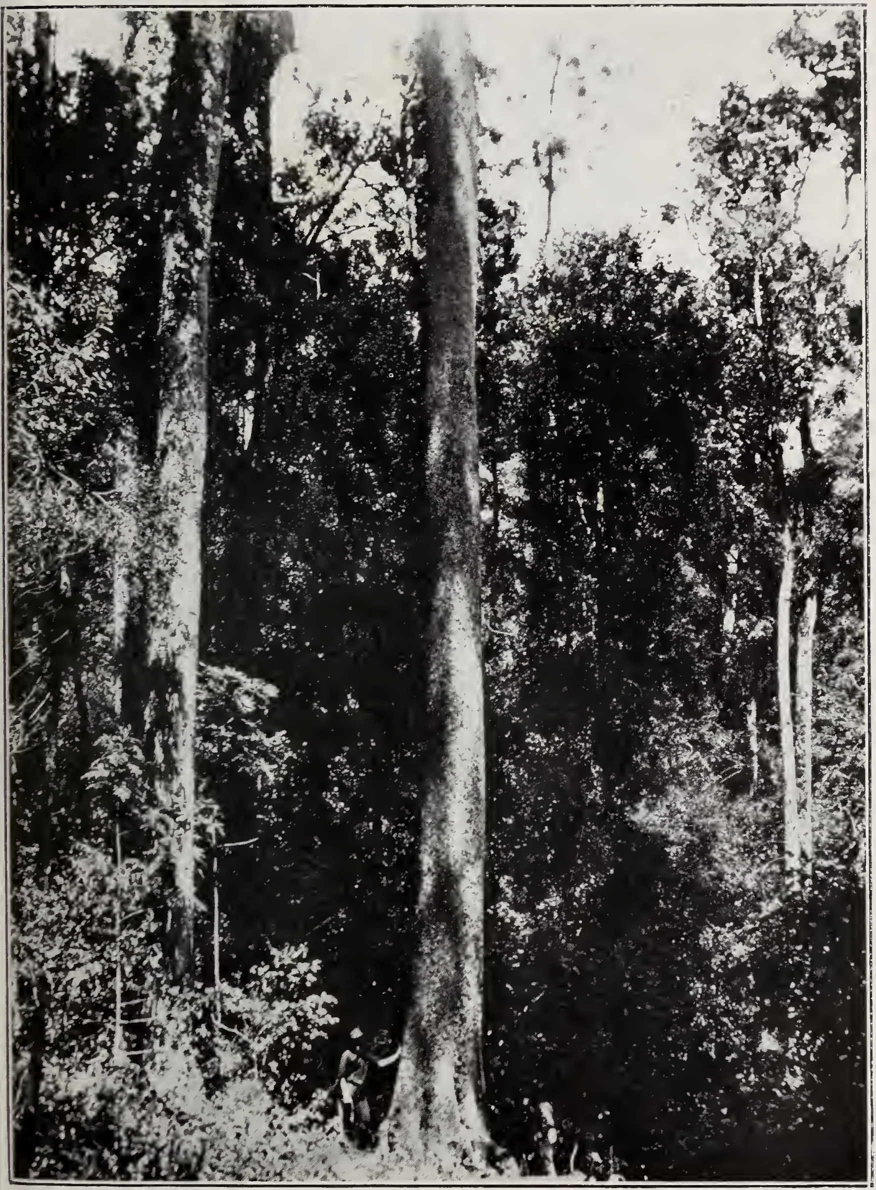


Fig. 118.—Rosewood (*Dysoxylum Fraseranum*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

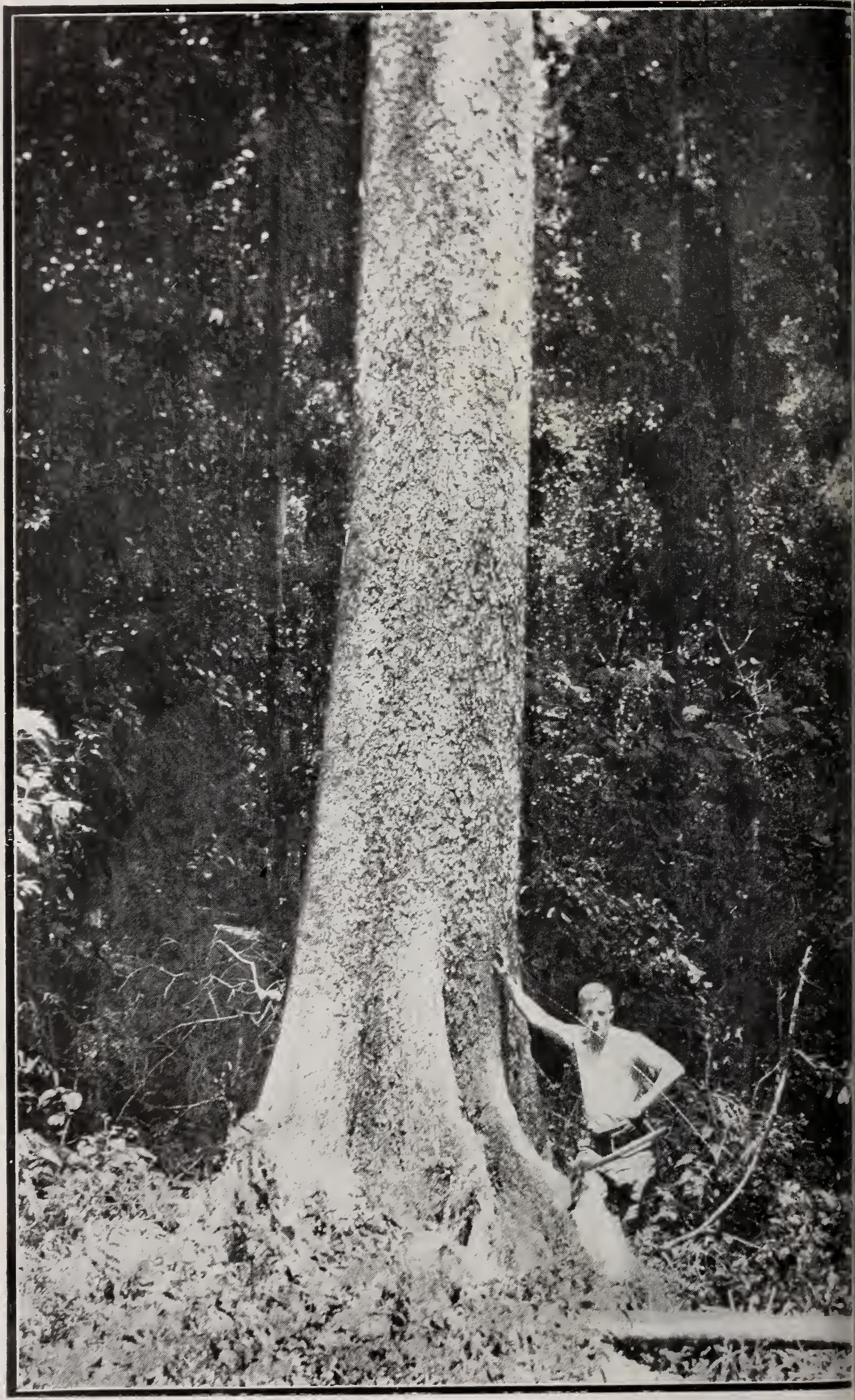


Fig. 119.—Rosewood (*Dysoxylum Fraseranum*). Lower portion of stem of tree represented in Fig. 118. Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

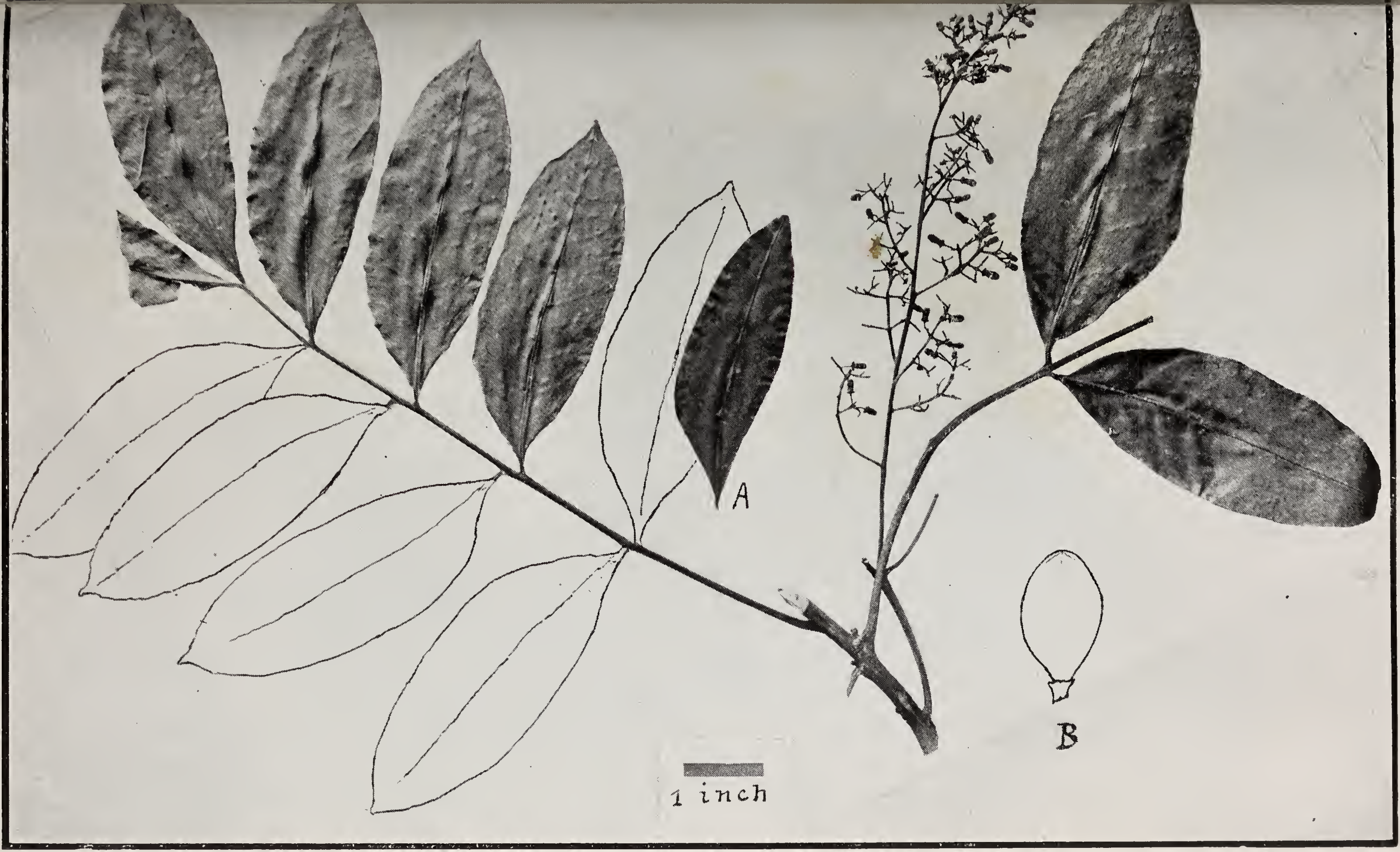


Fig. 120.—Rosewood (*Dysoxylum Fraseranum*). Branchlet with inflorescence (dry state). A, showing underside of leaflet; B, outline of fruit. All dry material. (*Photo.: Dept. Agric. and Stock, Brisbane.*)

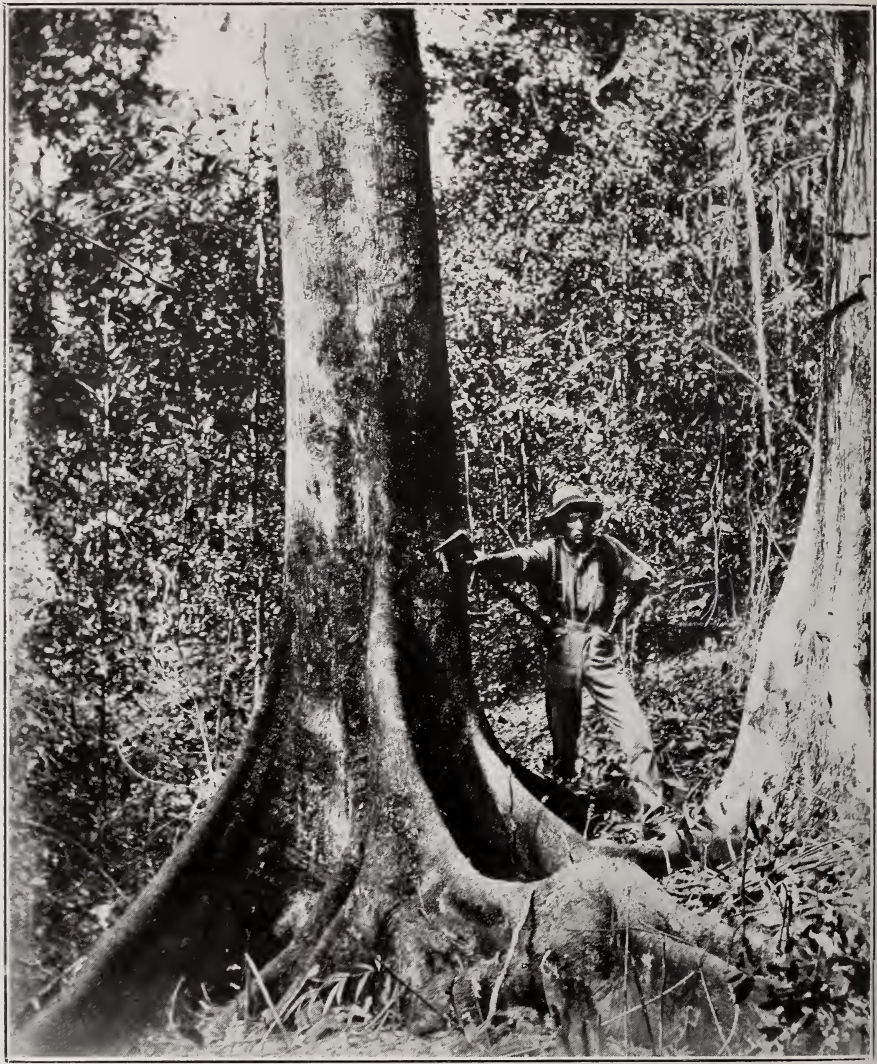


Fig. 121.—DYSOXYLUM MUELLERI Benth. (?). (Red Bean). Kin Kin, east of Gympie, about 26.2° S.

(*Photo.: W. D. F.*)

Description.—A tree attaining a height of 60 ft. and a stem diameter of 1 ft. 6 in. Stem sometimes irregular and angular in cross-section but not prominently buttressed. Bark brown, generally very scaly, shed in small angular pieces; when cut, outer thin layer brown, inner thicker, layer bright red or pink, measuring $\frac{1}{4}$ in. in thickness on a tree with a stem diameter of 1 ft. 6 in. Very young shoots downy with brownish hairs. Leaves alternate, pinnate, consisting of 7–11 leaflets. Each leaflet has the appearance of an ordinary leaf, is borne on a stalklet $\frac{1}{8}$–$\frac{1}{4}$ in. long, is elliptical in outline, often broader towards the apex which is frequently drawn out into a short blunt point, midrib and a few lateral nerves visible on both surfaces, frequently there is a small tuft of hairs on the underside where the lateral nerves join the midrib; measurement of leaflet blade, 2–3$\frac{1}{2}$ in. long, 2–3 times as long as broad. Flowers in small inflorescences (panicles) about 1 in. or less in length, situated in the forks of the leaves. Stalklets of individual flowers about $\frac{1}{12}$–$\frac{1}{8}$ in. long. Flowers about $\frac{1}{4}$ in. in diameter when open. The outer or lowermost part of the flower, the calyx, is about $\frac{1}{8}$ in. in diameter and is divided for about half its length into 4 or occasionally 5 round or oval lobes with a fringe of minute hairs on the margins. On the inner side of the calyx are 4 or occasionally 5 oval petals about $\frac{1}{6}$ in. long. On the inner side of the petals is the staminal tube, which is cup-shaped or broadly cylindrical and about $\frac{1}{8}$ in. long and bears on the inside at the summit 8 or 10 anthers about $\frac{1}{24}$ in. long. On the inner side of the staminal tube is the ovary, which is round but flattened towards the rim, densely downy, 3-celled, 3-angled towards the summit which tapers into a narrow downy style about $\frac{1}{12}$ in. long; style surmounted by a small, circular, hairless stigma. Fruit more or less 3-lobed or occasionally 2- or 1-lobed, attaining about 1 in. in diameter, containing 3 or occasionally 2 or 1 cell. Seeds 2 in each cell, flattened, about $\frac{1}{4}$ in. in diameter, embedded one on each side of a fleshy substance (the arillus). Flowering period: April; in fruit in September, October, and November.

Distribution.—Coastal scrubs from Milton, N.S.W. (J. H. Maiden), to Bundaberg, Queensland.

Uses.—The timber could be used for cabinet-work and indoor fittings. The tree is not a first-class timber tree, because it is so often rather small with an irregular or crooked stem, which in some localities is often hollow towards the centre.

Synoum Muelleri C. DC. is closely allied to *Synoum glandulosum*, from which it differs in its longer inflorescence and 2-celled ovary. The specimens of the two species are very similar in general appearance, and *Synoum Muelleri*, when better known, may prove to be the Northern form of *Synoum glandulosum*. *S. Muelleri* is found in the Atherton district and at Rockingham Bay, North Queensland.

References.—*Synoum glandulosum* A. de Jussieu, Memoires du Museum (Paris), vol. 19, p. 227, Plate 15, 1830. *Synoum Muelleri* was described by A. and C. de Candolle in Monographiae Phanerogamarum, vol. i., p. 593, 1878.

6. OWENIA.

Owenia venosa F.v.M. Crow's Apple, Rose Almond. Figs. 124 and 125.

Derivation.—Owenia, dedicated to Professor Owen; *venosa* Latin, veiny (probably alluding to the veins of the leaflet).

Description.—A tree attaining a height of about 70 ft. and a stem diameter of about 1 ft. 6 in. Stem not buttressed at the base. Bark grey, with patches of brown, very scaly, shed in square and oblong pieces; when cut, purplish brown, becoming much paler inwards, measuring $\frac{1}{2}$ in. in thickness on a tree with a stem diameter of 1 ft. 3 in. All parts hairless. Young shoots more or less covered by a yellow or dark-brown resinous substance. Leaves pinnate, alternate, consisting of 6–8 or sometimes 9 leaflets; the axis (rhachis) to which the leaflets are attached is often angular or extended into a flattened wing on each side, especially in seedling plants and coppice ("sucker") growths. Each leaflet has the appearance of an ordinary leaf, is borne on a very short stalklet, is elliptical or narrowly elliptical in outline, often unequal sided, finely notched or blunt at the apex, glossy above, dull on the underside; the midrib, lateral nerves, and net-veins visible on the upper surface but more conspicuous on the underside; measurement of leaflet, 1$\frac{1}{2}$–3$\frac{1}{2}$ in. long, 2–4 times as long as broad. Flowers in narrow inflorescences (slender panicles) situated in the forks of the leaves, the panicles often about as long as the leaves. Individual flowers about $\frac{1}{5}$ in. long; the lowermost part, the calyx, is divided to the base into 5 round overlapping lobes about $\frac{1}{10}$ in. in diameter. On the inner side of the calyx are 5 petals, egg-shaped in outline and about $\frac{1}{6}$ in. long. On the inner side of the petals is the broadly cylindrical staminal tube which measures about $\frac{1}{8}$ in. long, is finely hairy on the inside in the upper part, is divided at the top into 10 minute overlapping lobes about one-fifth of the length of the tube, and bears 10 anthers, each about $\frac{1}{20}$ in. long, inserted inside at the top between the minute lobes. Ovary, in the centre of the flower, enclosed in the base of the staminal

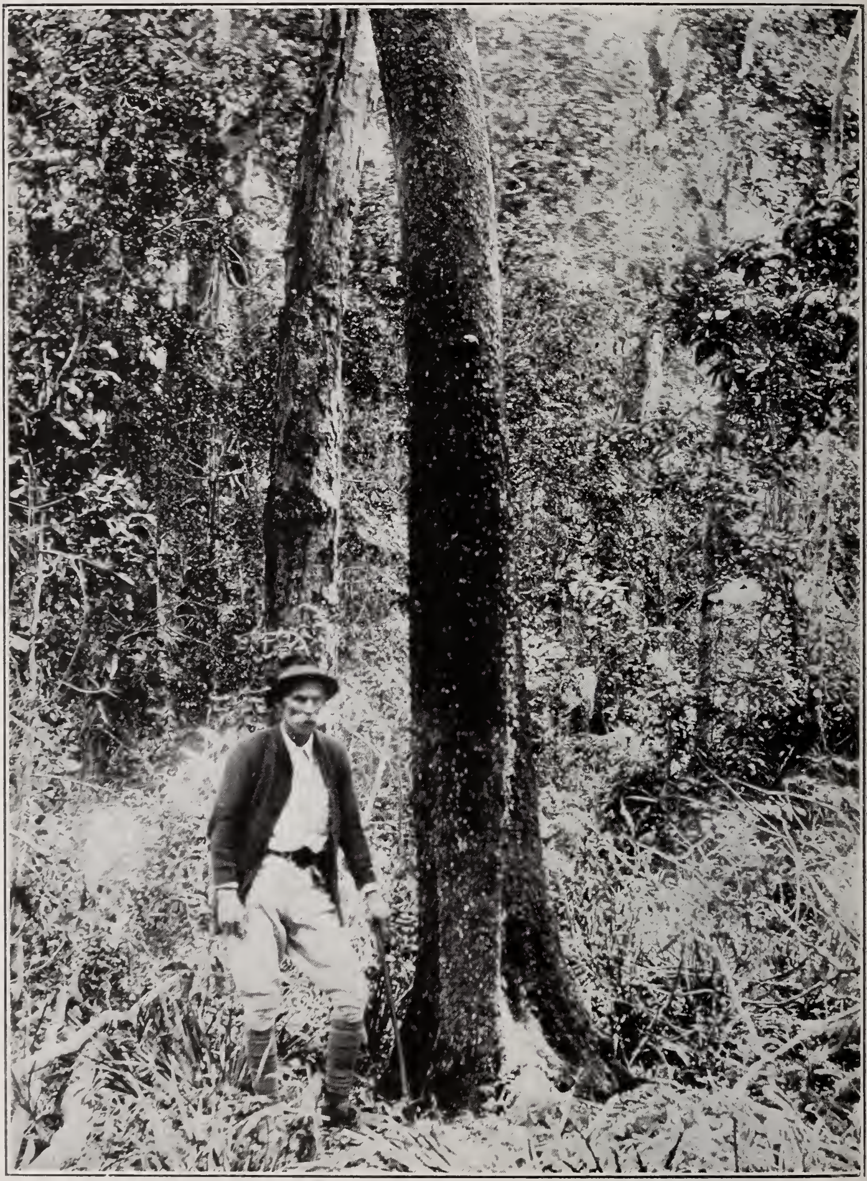


Fig. 122.—Scentless Rosewood (*Synoum glandulosum*). Roberts Plateau, Macpherso Range, about 28.3° S. The scaliness of the bark is evident in the upper and lower portions o the picture.

(*Photo.: W. D. F.*)

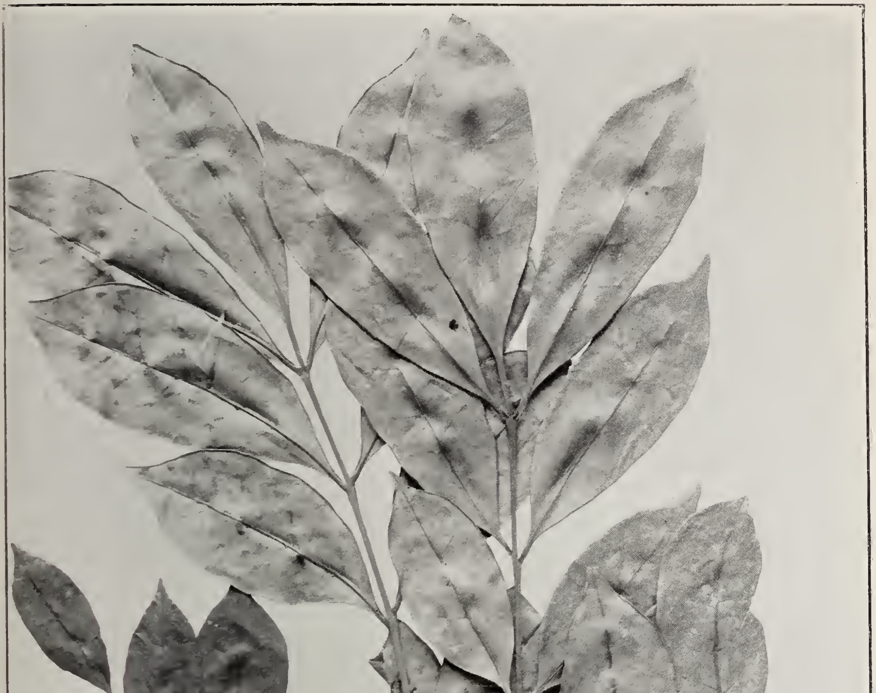


Fig. 123.—Scentless Rosewood (*Synoum glandulosum*). A, inflorescence-bearing branchlet; B, fruit-bearing branchlet. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

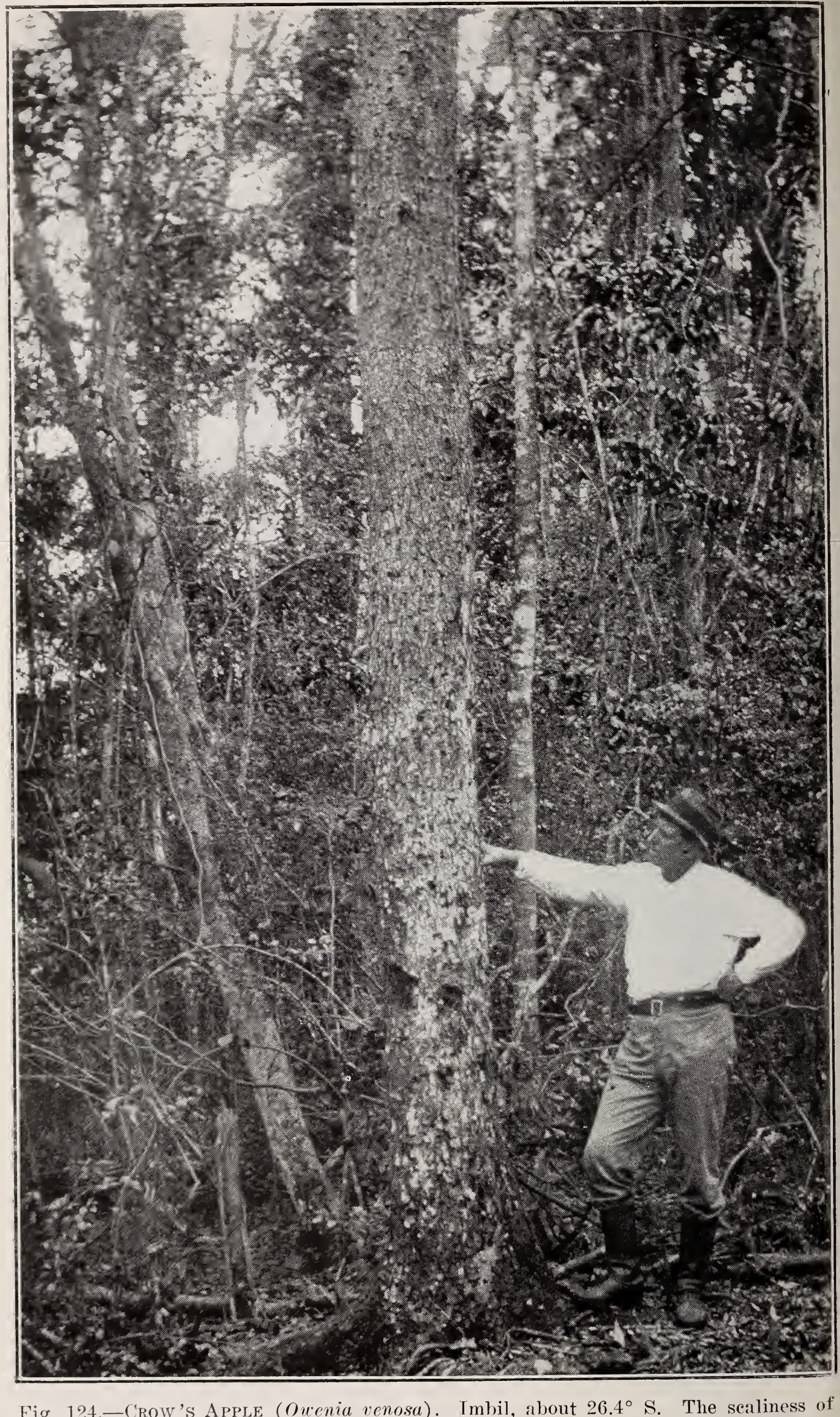


Fig. 124.—Crow's Apple (*Owenia venosa*). Imbil, about 26.4° S. The scaliness of the bark is shown in the picture.

(*Photo.: W. D. F.*)

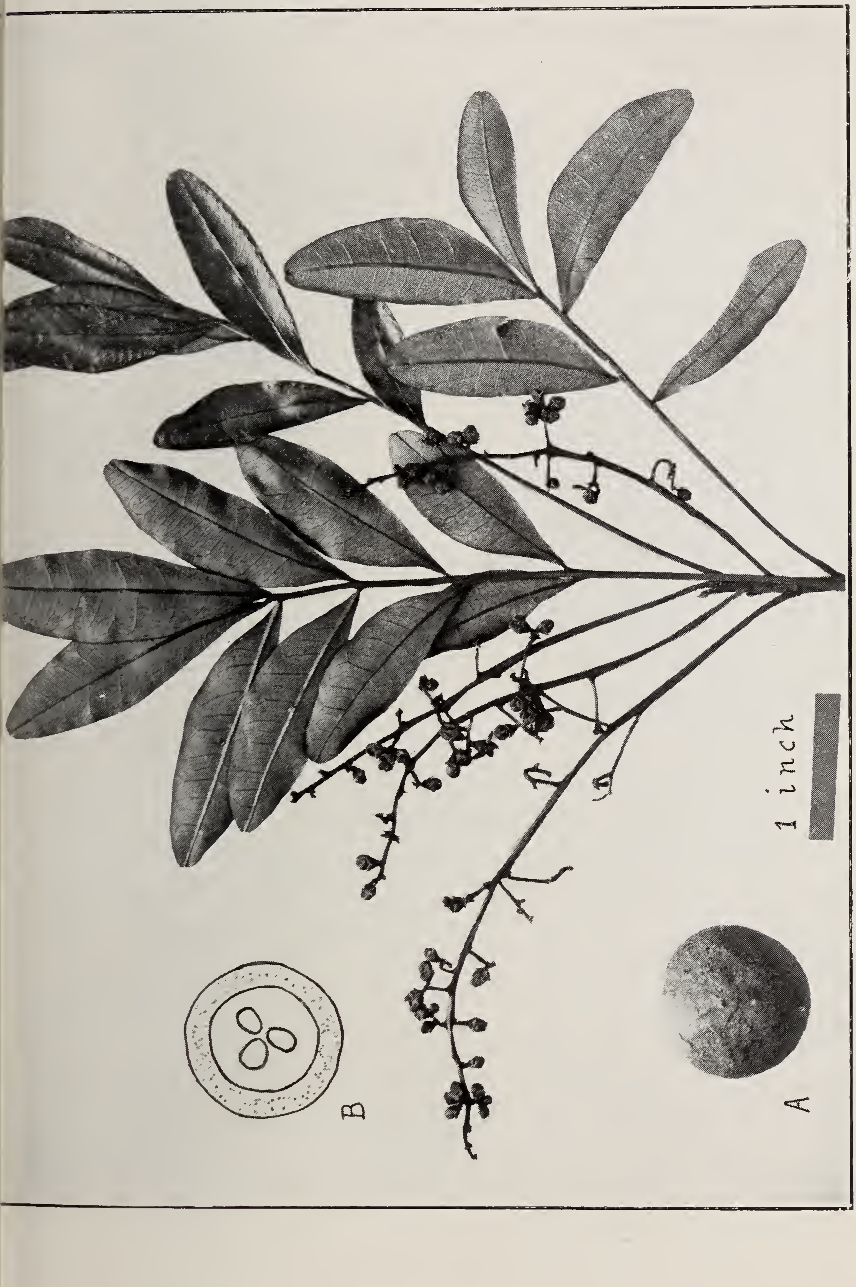


Fig. 125.—Crow's Apple (*Owenia venosa*). Flower-bearing branchlet (dry state). A, dry fruit; B, transverse section of fruit. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

tube, egg-shaped, surmounted by a broadly conical stigma. Fruit red, globular, $1-1\frac{1}{2}$ in. in diameter with a fleshy outer coat surrounding a hard inner part, the inner part containing from 2–4 cells, each cell containing a single seed. Flowering period apparently irregular, as there are flowering specimens in the herbarium collected in January and the Rev. B. Scortechini records it as flowering and fruiting in October.

Distribution.—Common in the drier scrubs of the coastal area of Queensland from the border of N. S. Wales to Rockhampton, in such places as Boonah, Rosewood, Benarkin, Nanango, Imbil, Many Peaks, and as far west as Eidsvold. It is confined to Queensland.

Uses.—The timber should be useful for general indoor work.

Reference.—*Owenia venosa* F.v.Mueller in Hooker's Kew Journal, vol. ix., p. 304.

Owenia cepiodora F.v.M. Onionwood of N. S. Wales. Tree 100 ft. high and 18 in. stem diameter (J. H. Maiden). Leaves crowded at ends of branchlets, pinnate, leaflets up to 19. Leaflets distinguished from those of *Owenia venosa* (*see* Fig. 125) by their tapering or sharp points. Fruit globular, red, up to $\frac{2}{3}$ in. diameter.—Clarence to Tweed River (Maiden).

Family EUPHORBIACEAE.

Fruit disk-shaped, not succulent, splitting open, consisting of 5–7 1-seeded cells. Leaves alternate .. .. .. 1. *Glochidion.*

Fruit succulent and not splitting open. Leaves alternate.

Fruit red; inner hard part containing 1 cell and 1 seed which is grooved on one side .. .. 2. *Hemicyclia.*

Fruit yellow or brown, inner hard part mostly 2-celled and 2-seeded .. .. 4. *Bridelia.*

Inner hard part of fruit more or less 4–5 valved and enclosing mostly 1 seed .. .. 10. *Fontainea.*

Fruit mostly 3-lobed and 3-celled, splitting open and not succulent.

Leaves mostly opposite or sometimes in groups of 3–5.

Fruit downy or densely downy. Seeds 1 or 2 in each cell 3. *Dissiliaria.*

Fruit smooth or slightly rough but not downy .. .. 9. *Baloghia.*

Shoots, young branchlets, and underside of leaves silvery with stellate scales .. .. 5. *Croton insularis.*

Leaves mostly alternate.

Leaves with 2 small glands (sometimes elongated) at apex of stalk. Flowers mostly in racemes. Calyx segments 4–6; petals 4–6 .. .. 5. *Croton.*

Leaves often with 2 small glands at apex of stalk. Calyx with 3–4 segments. Petals none .. .. 6. *Claoxylon.*

Leaf-blades sometimes with 2 small glands at base and numerous minute coloured glands on underside. Calyx segments 3–4. Petals none .. .. .. 7. *Mallotus.*

Leaves with about 9 main nerves radiating from insertion of stalk. Calyx segments 3–4. Petals none. Capsule with a few processes .. .. 8. *Macaranga.*

Leaves with toothed margins. Green parts milky when broken .. .. 11. *Excaecaria.*

Fruit mostly 2-lobed and 2-celled.

Leaves very broad at base, tapering towards apex, turning red or crimson in age .. .. 12. *Homalanthus.*

1. GLOCHIDION.

Glochidion Ferdinandi Muell. Arg. Tree up to 80 ft. Bark grey with a tendency to be finely fissured. Leaves alternate, from their arrangement in two rows (distichous) often with false appearance of being pinnate, stalks $\frac{1}{8}-\frac{1}{4}$ in., blades egg-shaped or lance-shaped in outline, often unequal-sided, venation more prominent on underside, 2–4 in. long, 2–3 times as long as broad. Fruit springing from forks or above forks of leaves, disk-shaped with depression in centre, up to $\frac{5}{8}$ in. long, consisting of 5–7 cells, each cell containing 1 or 2 seeds.—Illawarrra (Maiden) to Cairns and North-west Australia.

2. HEMICYCLIA.

Hemicyclia australasica J. Mull. Yellow Tulip, Grey Boxwood. Figs. 126 and 127.

Derivation.—Hemicyclia from Latin *hemicyclium*, a half-circle (referring, according to some authors, to the shape of the stigma); australasica, Australasian.

Description.—A tree attaining a height of about 90 ft. and a stem diameter of 2 ft. Stem not prominently flanged at the base in South Queensland specimens. Bark grey or sometimes brown, often scaly, shed in round or angular pieces, in appearance closely resembling that of the Tulipwood (*Harpullia pendula*); when cut, dull yellow, measuring $\frac{3}{16}$ in. thick on a tree with a stem diameter of 2 ft. Sapwood flesh-coloured. Young shoots and flowers with a few minute hairs. Leaf-stalks $\frac{1}{6}$–$\frac{1}{4}$ in. long. Leaves alternate, egg-shaped, lance-shaped, or elliptical in outline, margins entire, toothed or wavy, apex rounded or produced into a short blunt point, both surfaces glossy; midrib, lateral nerves, and numerous fine net-veins plain on both surfaces especially on the underside; measurement of leaf-blade, 1–3 in. long, $1\frac{1}{2}$–3 times as long as broad. Flowers solitary or in clusters situated in the forks of the leaves or above or below them; the clusters of male flowers sometimes lengthen into short racemes; the female flowers are frequently solitary. Male and female elements in separate flowers and the sexes on separate trees. The individual flowers measure about $\frac{1}{6}$ in. in diameter and are borne on stalklets $\frac{1}{8}$–$\frac{1}{2}$ in. long; female flowers mostly have longer stalklets than the males. The outer part of the flower consists of the perianth which is divided almost to the base into 4 or 5 oval lobes about $\frac{1}{10}$ in. long. Surrounded by the perianth, in male flowers, are 5–10 stamens, not exceeding the perianth lobes in length, with large anthers longer than the filaments. In female flowers the perianth encloses the egg-shaped or oval ovary, which contains a single cell with 2 ovules; at its apex the ovary bears a semicircular stigma. Fruit oval, red, fleshy on outside, $\frac{1}{2}$–$\frac{3}{4}$ in. long, smooth, the inner hard part surrounding an oval seed grooved on one side and measuring about $\frac{1}{2}$ in. long.

Distribution.—Coastal scrubs of Eastern Australia from Port Macquarie, N.S.W. (J. H. Maiden), to Cairns, North Queensland, extending inland in Queensland to the Bunya Mountains (about 100 miles from the coast) and to Chillagoe. Lord Howe Island.

Uses.—The timber should be useful for cabinet-making and general indoor work in instances where a figured wood is not required.

Reference.—*Hemicyclia australasica* J. Muller (Arg.) in A. de Candolle's Prodromus, vol. xv., part ii., p. 487.

3. DISSILIARIA.

Dissiliaria baloghioides F.v.M. Hauer, Lancewood, Blackheart, Redheart. Figs. 128 and 129.

Derivation.—Dissiliaria from Latin *dissilio*, to fly apart (alluding to the bursting of the capsules); baloghioides from *Baloghia*, the name of a genus of Euphorbiaceous plants; Greek *eidos*, resemblance (alluding to the resemblance of the species to a *Baloghia*).

Description.—A tree attaining 120 ft. in height and a stem diameter of 3 ft. Few of the trees attain more than 2 ft. in stem diameter. The base of the stem in large trees is somewhat flanged but not prominently buttressed. Bark dark brown or brown, often marked by minute scattered pustules and frequently shed in thin flakes or strips. When the bark is cut it is seen to be reddish pink in colour and measures $\frac{1}{6}$ in. thick on a tree with a stem diameter of 1 ft. 9 in. There is a large amount of pale sapwood surrounding the dark, almost black, hard, flint-like heartwood, which bleaches on exposure to a brown or dark-brown or reddish-brown colour. The bark on the branchlets is brown and dotted with small, pale, raised spots (lenticels). The leaves are opposite or in threes and are inserted on stalks about $\frac{1}{4}$ in. long. The leaf-blades are oval, narrowly oval, or egg-shaped in outline, often narrowed to a blunt point at the apex, upper surface glossy; midrib, lateral nerves, and numerous net-veins visible on both surfaces; measurement of leaf-blades, $2\frac{1}{2}$–4 in. long, 2–3 times as long as broad. Male and female flowers in separate clusters. The clusters consist of 4–20 flowers situated just above the uppermost or second pair or triplet of leaves. The individual flowers are borne on stalklets $\frac{1}{8}$–$\frac{1}{2}$ in. long. Each flower is about $\frac{1}{5}$ in. diameter and consists of a flat or cup-shaped envelope of 6 oval lobes (perianth lobes) about $\frac{1}{10}$ in. long. In male flowers the perianth encloses a hairy receptacle bearing 15–20 slender stamens about $\frac{1}{10}$ in. long. In female flowers the perianth encloses a downy globular ovary about $\frac{1}{10}$ in. in diameter and bearing at its apex 3 slender much-curved styles. Fruit capsular, almost globular, densely downy, about $\frac{3}{4}$ in. in diameter, crowned by the persistent base of the styles. The outer part of the fruit is a thick woody covering, splitting into 6 equal segments; the internal part is divided into 3 woody cells, each cell readily splitting open in two equal parts and each cell containing 1 or 2 seeds. Flowering period: March.

Distribution.—Confined to Queensland. Queensland coastal scrubs from Brisbane to as far north as Proserpine, between Bowen and Mackay. Very plentiful in scrubs in the neighbourhood of Gympie and in the Sarina neighbourhood, south of Mackay.

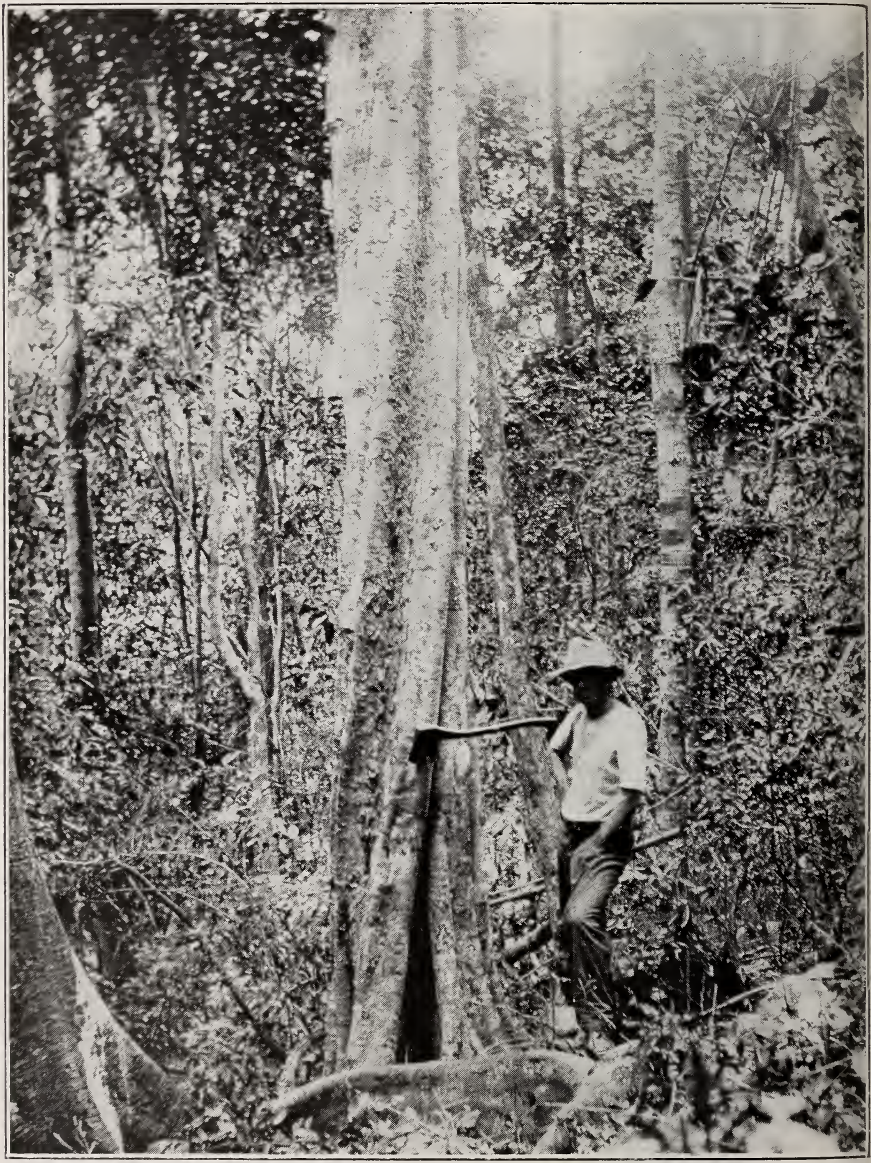


Fig. 126.—Yellow Tulip (*Hemicyclia australasica*). Kin Kin, about 26.2° S. The tree is hollow at the base.

(*Photo.: W. D. F.*)

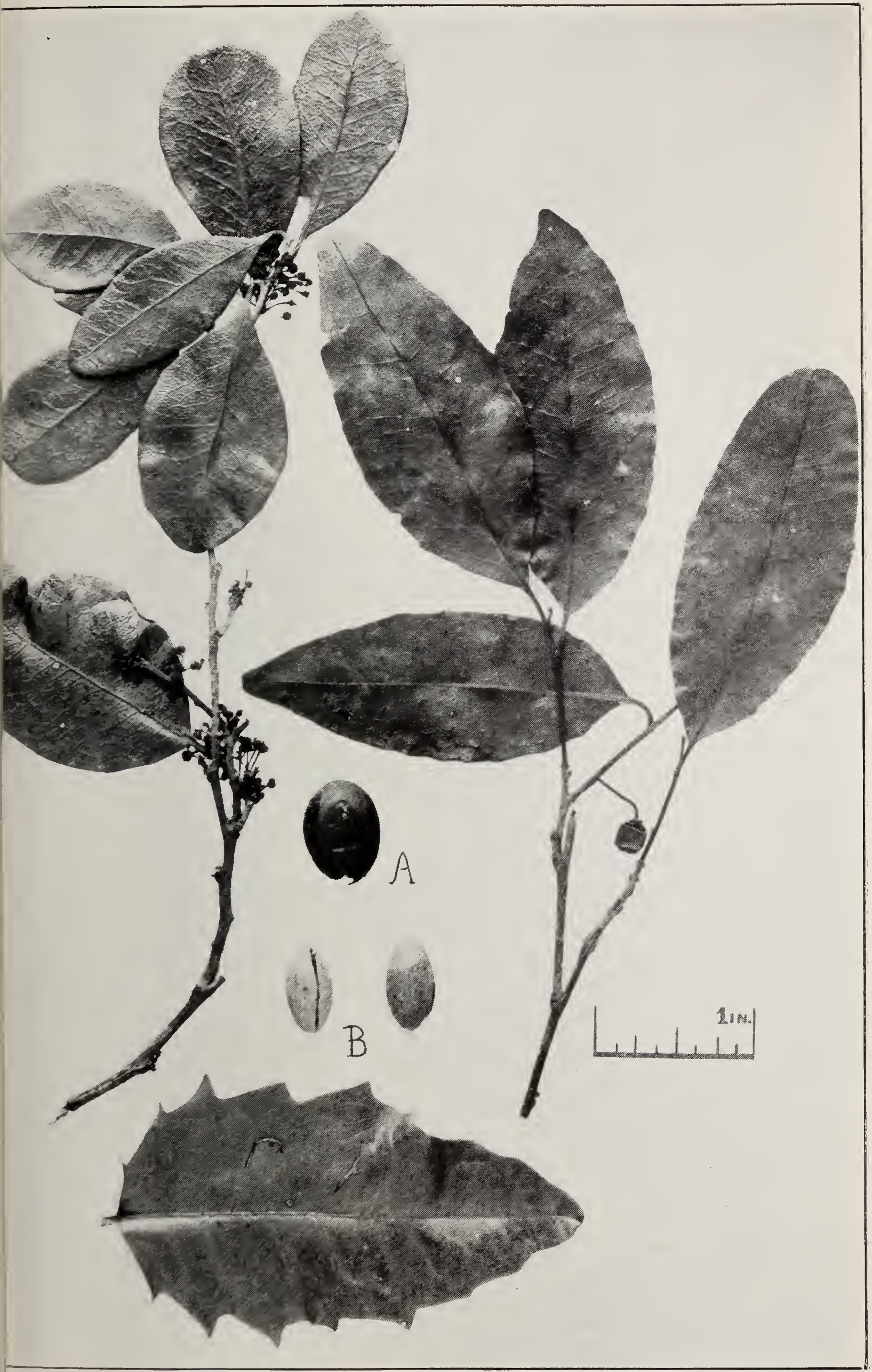


Fig. 127.—YELLOW TULIP (*Hemicyclia australasica*).—The twig on left is flower-bearing; the one on the right bears an immature fruit. The leaf below is from a coppice shoot. A, dry fruit; B, hard inner part of fruit containing the seed. The groove on one side of the inner hard part is shown. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

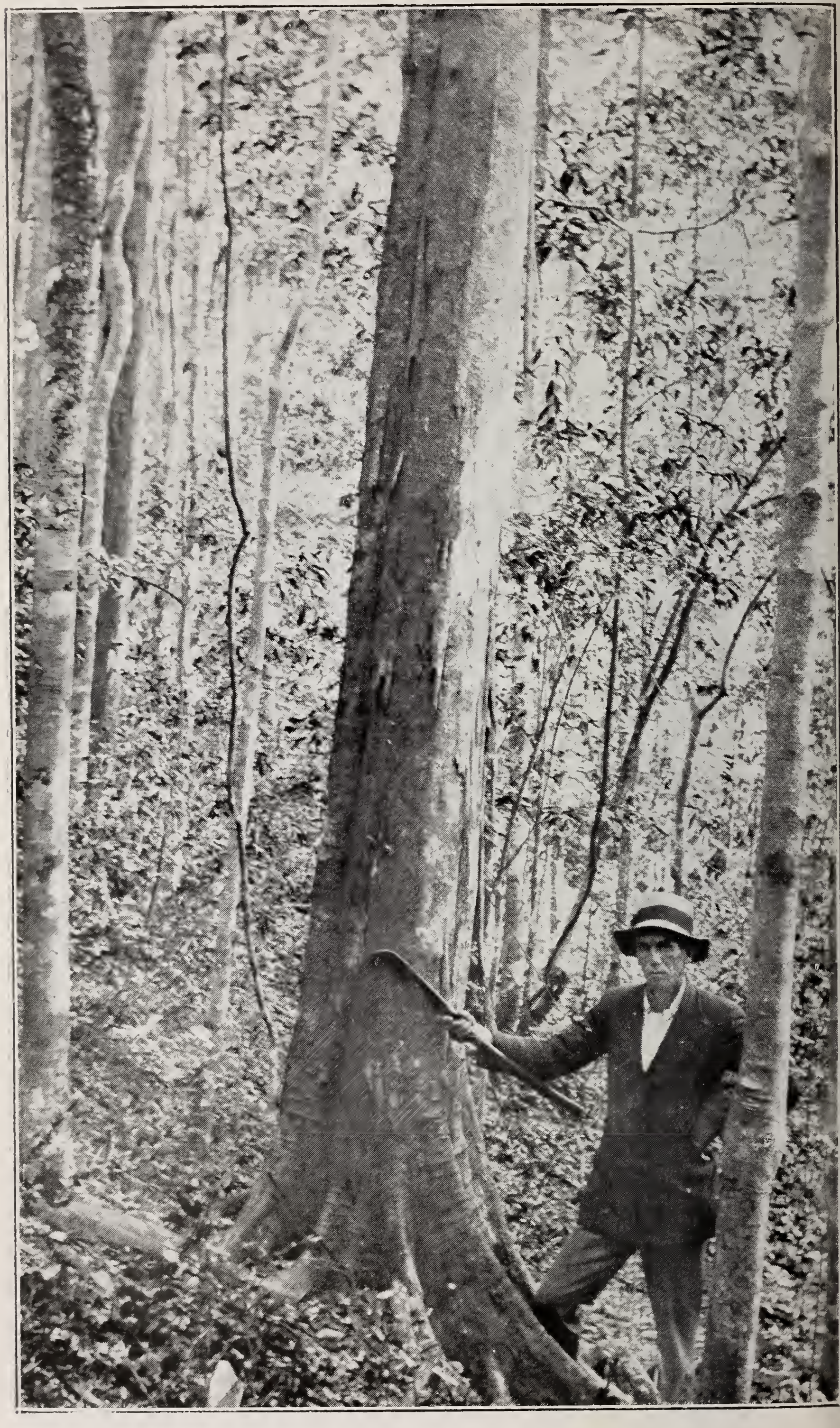


Fig. 128.—Hauer (*Dissiliaria baloghioides*). Kin Kin, about 26.2° S. The partly detached strips of bark are evident in the picture.

(*Photo.: W. D. F.*)

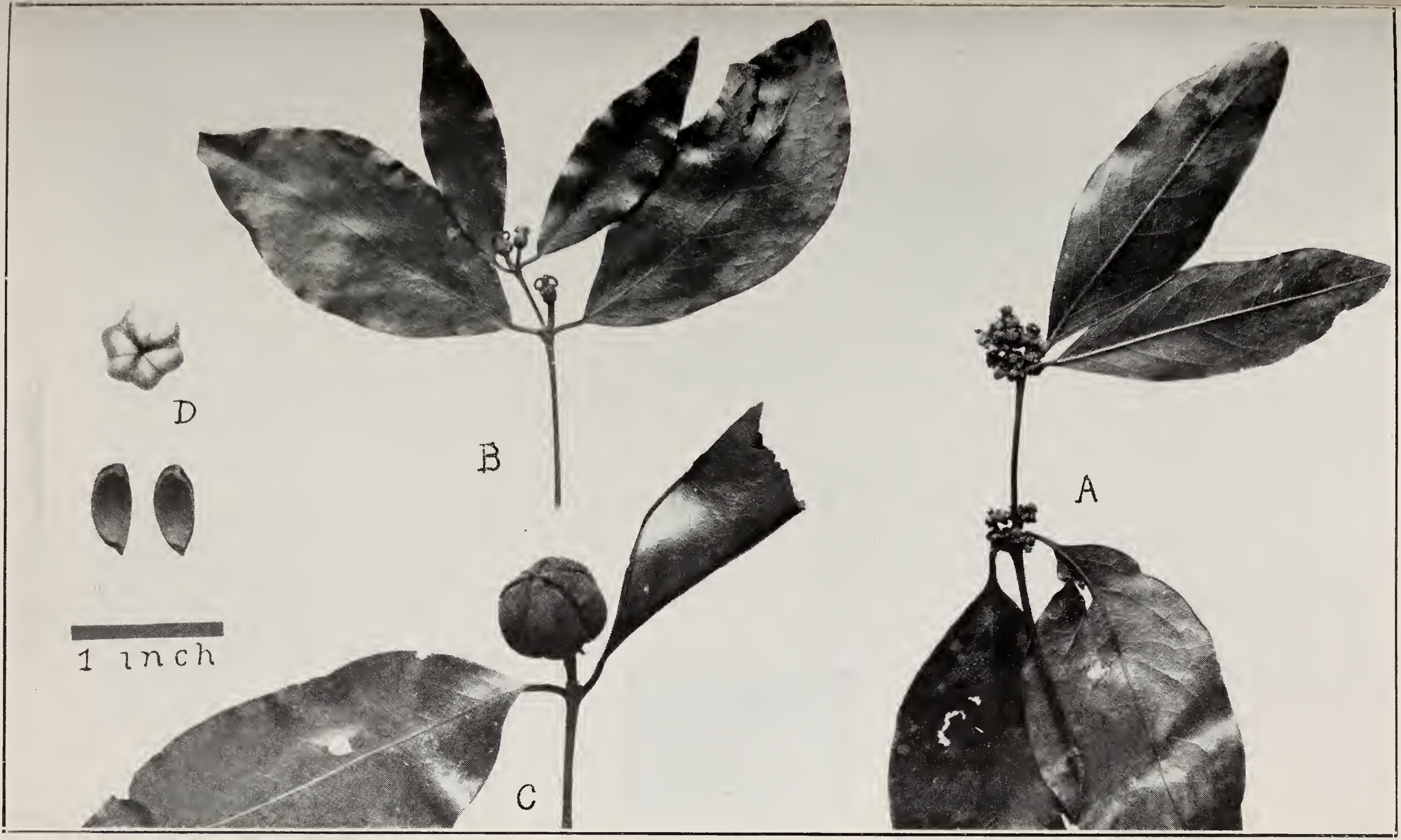


Fig. 129.—HAUER (*Dissiliaria baloghioides*). A, branchlet with male inflorescences; B, branchlet with female flowers; C, branchlet with fruit; D, fruit with outer covering removed. The inch scale applies to all figures. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

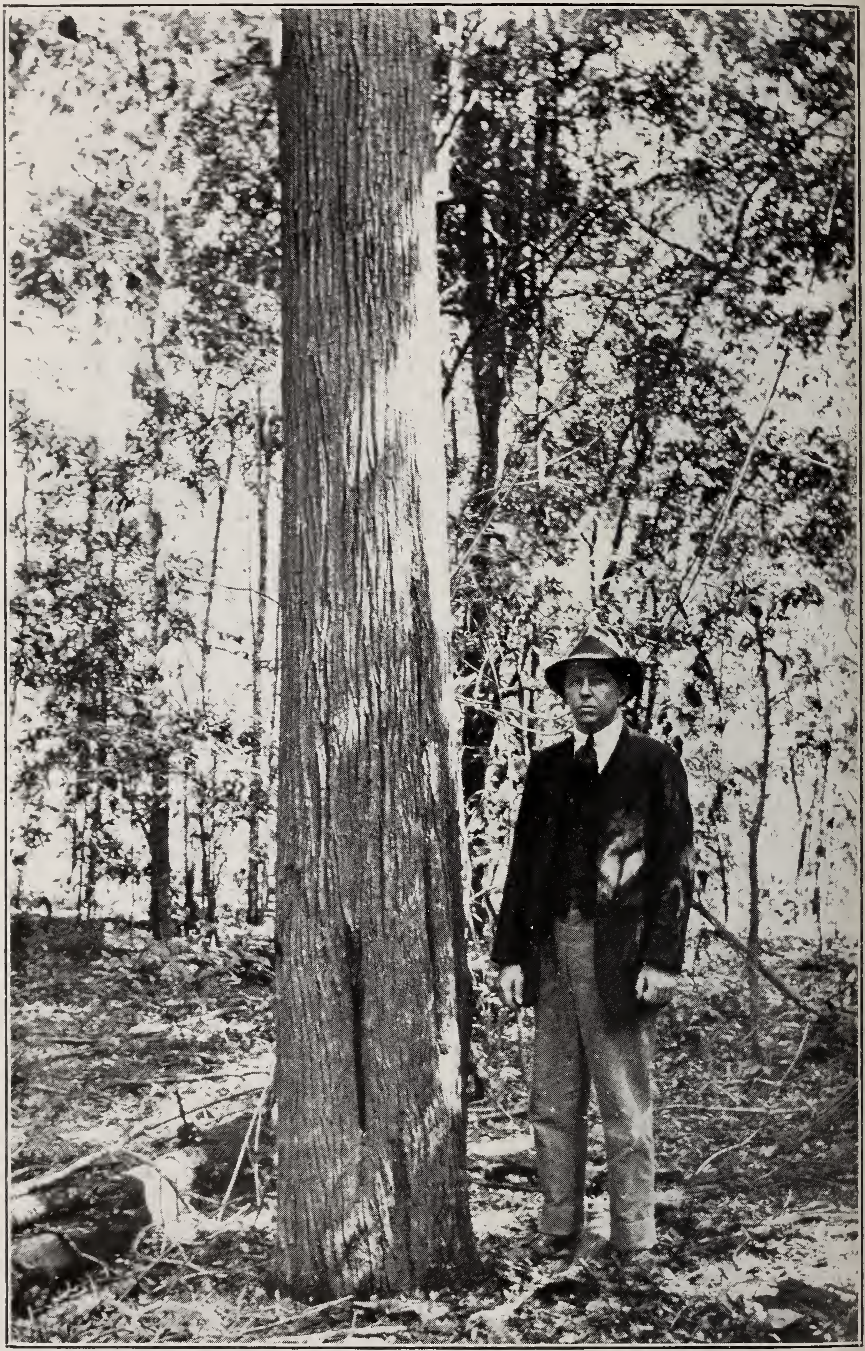


Fig. 130.—Scrub Ironbark (*Bridelia exaltata*). Goodna, near Brisbane, about 27.5° S. The prominent fissures of the bark are shown.

(*Photo.: W. D. F.*)

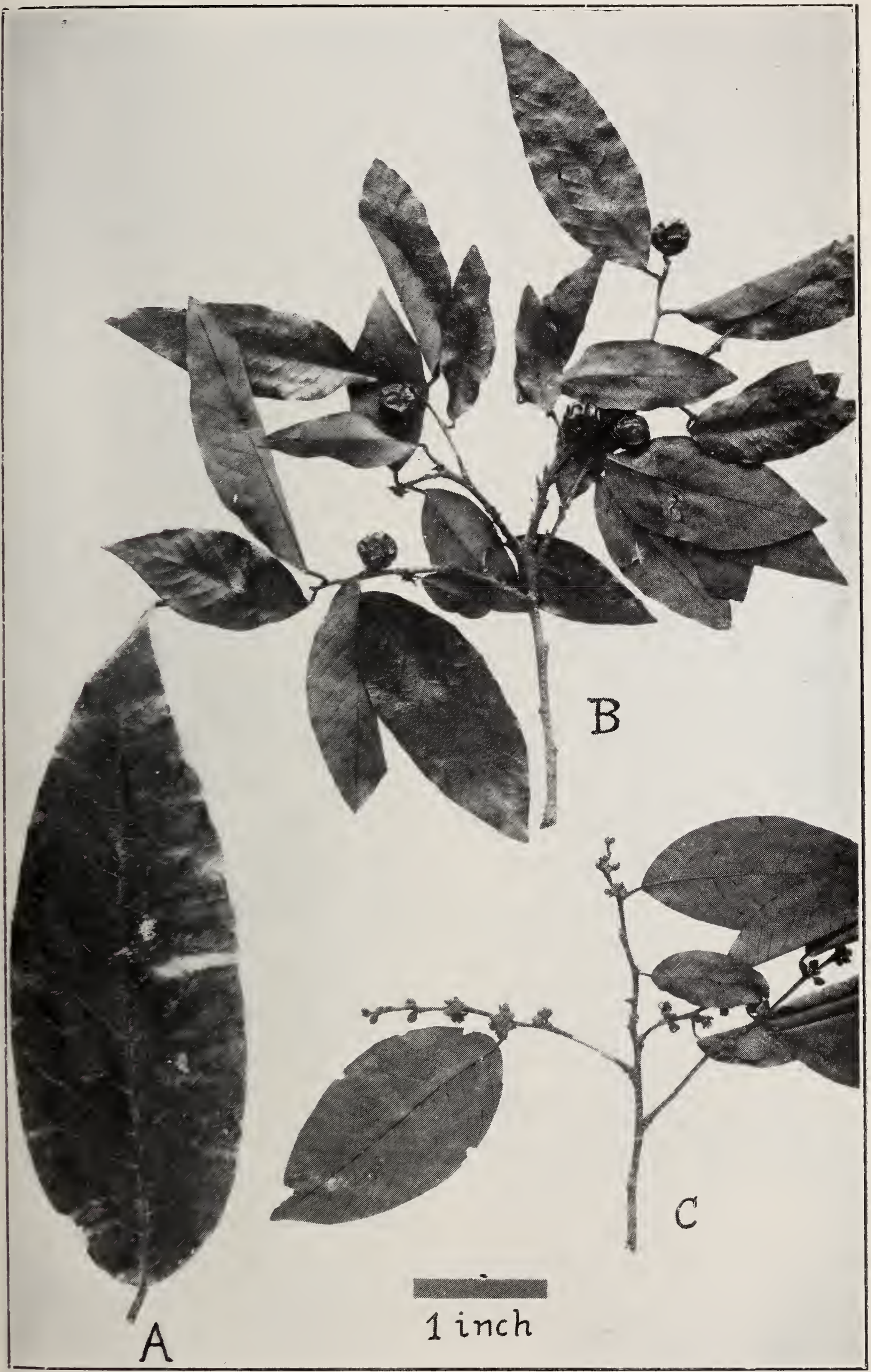


Fig 131.—Scrub Ironbark (*Bridelia exaltata*). A, large leaf from coppice growth; B, fruit-bearing branchlet; C, flower-bearing branchlet. All specimens in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Uses.—The timber is very durable and has been used for fencing posts and logging on timber tracks. F. M. Bailey in Queensland Flora quotes Schneider to the effect that the blacks used the wood for spears, nullahs, and paddymelon sticks.

Reference.—*Dissiliaria baloghioides* F.v.Mueller in Baillon's Adansonia, vol. 7, p. 359, 1867.

Dissiliaria Muelleri Baill. (?). Similar in field characters to *D. baloghioides* (C. T. White) (*see* Figs. 128 and 129). Leaves and flowers resemble those of *D. baloghioides* but leaf margins toothed and leaf-blades often smaller.—Near Maryborough.

4. BRIDELIA.

Bridelia exaltata F.v.M. Scrub Ironbark, Grey Birch. Figs. 130 and 131.

Derivation.—Bridelia, after Professor Bridel, an early worker on mosses; *exaltata* Latin, lofty.

Description.—A tree attaining a height of about 100 ft. and a stem diameter of about 2 ft. Stem not prominently buttressed. Bark dark brown in colour and prominently furrowed or fissured; when cut it is seen to be red internally, and measures about ½ in. in thickness on a tree with a stem of 2 ft. diameter. Sapwood white, heartwood light brown. Leaf-stalks ⅛–¼ in. long. Leaves alternate, narrowly egg-shaped in outline, narrowed at the apex, with prominent lateral nerves and net-veins especially on the underside, upper face somewhat glossy, under surface paler and duller; measurement of leaf-blade 1½–2½ in. long, 2–3 times as long as broad; the leaves on coppice ("sucker") shoots and young trees are often much larger. Flowers small, in small clusters of about 6 or less in the forks of the leaves or at the scars of fallen leaves. Fertile male and female organs in separate flowers; the flowers of both sexes often on the same tree and in the same cluster. Stalks of individual flowers 1/12 in. or less in length. Individual flowers about ¼ in. or less in diameter when expanded, consisting of 4 or 5 triangular calyx lobes, 4 or 5 small toothed petals inserted between the calyx lobes and shorter than them, a flat circular disk in centre of flower; and in male flowers, 5 stamens about 1/10 in. long, united at the base and surrounding an abortive ovary; in female flowers an ovary, which is egg-shaped and hairless. Fruit globular, yellow when fresh, turning brown, about ⅓ in. in diameter, with a fleshy outer coat surrounding a "stone," which is generally 2-celled, and when ripe contains 1 seed in each cell. Flowering period (?); in fruit from March to June.

Distribution.—Coastal scrubs of Southern Queensland and Northern N. S. Wales (Bentham). The northernmost locality record at present is the Gympie district. It is common in the remnants of "scrub" (rain forest) about Brisbane, in the Goodna scrubs, and in the drier "scrubs" of the Beaudesert and Canungra districts.

Uses.—R. T. Baker ("Hardwoods of Australia," p. 356) states that the timber is not uncommon on the Sydney market, and that it is suitable for carriage and coach parts, shipbuilding, and general constructional work.

Notes.—The tree is very common in some localities as secondary undergrowth in paddocks, and as the leaves, like those of young sorghum and some other well-known plants, contain a prussic-acid yielding glucoside, they may, if eaten in quantity by stock, produce death, though no actual losses due to the plant have been recorded. The ripe berries, which are generally produced in great abundance, are greedily sought after by fruit-eating birds.

Reference.—*Bridelia exaltata* F.v.Mueller in Fragmenta Phytographiae Australiae, vol. 3, p. 32, 1862–1863.

Bridelia faginea F.v.M. Distinguished from *B. exaltata* (*see* Fig, 131) by its smaller leaves (up to 2 in. long) with fine hairs on underside.—Darling Downs to Proserpine.

5. CROTON.

Croton spp. Shrubs or small trees up to 60 ft. high. Leaves with 2 small glands (sometimes elongated) at apex of stalk. Calyx with 5 (sometimes 4 or 6) segments; petals of same number as calyx segments; stamens 5 to above 30. Fruit mostly 3-celled with 1 seed in each cell. The glands at apex of leaf-stalk are sometimes present in other Euphorbiaceae.

Croton insularis Baill. Queensland Cascarilla Bark. Has a fragrant bark; leaves often in irregular groups of 2–5 at ends of branchlets or at nodes; shoots, young branchlets, underside of leaves silvery with stellate scales; leaf-stalks ¼–½ in.; blades egg-shaped in outline, 1½–2½ in. long, 2–3 times as long as broad.—Blue Mountains (Benth.) to Atherton, west to Chinchilla.

Croton phebalioides F.v.M. resembles foregoing species, but the leaves are alternate (not in irregular groups), and narrower (3–5 times as long as broad).—Clarence River (Benth.) to Bowen, west to Chinchilla ; New Caledonia.

Croton Verreauxii Baill. lacks the white or silvery clothing of stellate scales which is present on the young shoots and underside of leaves of the two foregoing species ; leaves mostly alternate, green on both sides, margins toothed ; stalks ¼–¾ in. long ; blades 1¾–4½ in. long, 2–3 times as long as broad. According to Bentham there are 10–12 stamens in the male flowers.—Illawarra (Benth.) to Gympie ; Port Darwn, (Benth.).

Croton acronychioides F.v.M. is allied to *C. Verreauxii* but has thicker leaves and, according to Bentham, only 5–8 stamens in male flowers. Leaves mostly alternate and toothed, green on both sides ; stalks ¼–⅝ in. ; blades 2–4¾ in. long, 2–3 times as long as broad. Capsule mostly longer than broad.—Tambourine Mountain to Townsville ; N. S. Wales (Maid. and Betche).

Croton affinis Maid. & Bak. is described by Maiden and Baker as allied to *C. acronychioides* but is separated by its capsule which is broader than long and 3-lobed and furrowed. Leaves distantly toothed, 3–6 in. long, 2½ times as long as broad.—Richmond River.

6. CLAOXYLON.

Claoxylon australe Baill. Shrub or tree up to 25 ft. high. Young branchlets and leaves sometimes hairy. Often there are 2 minute glands at apex of leaf-stalk. Leaves alternate, stalks ¼–1½ in. long ; blades 3–7 in. long, 2–3 times as long as broad, margins mostly toothed. Flowers with 3 calyx segments, no petals, and 20 or more stamens. Fruit consisting of 3 globose lobes, each lobe ⅛–$\frac{3}{16}$ in. in diameter and containing 1 globose tuberculate seed.—Illawarra (Benth.) to Bowen (Benth.).

7. MALLOTUS.

Mallotus philippinensis Muell. Arg. Tree up to 50 ft. high and 1 ft. stem diameter. Often small and bushy. Bark deep red when cut. Branchlets and leaf-stalks often rust-coloured. Leaves alternate ; stalks ¾–2 in. long ; blades 2–5 in. long, 2–4 times as long as broad, with 2 minute glands on upper side at base and a pair of basal lateral nerves, underside paler with numerous minute red glands, sometimes downy on underside. Capsule mostly 3-lobed and 3-celled, ¼–⅜ in. broad, with 1 seed in each cell. Capsule clothed with a deep red glandular substance used as a dye for silk under name of Kamela.—Hastings River (Benth.) to Cairns ; Papua ; Eastern Asia.

Mallotus discolor F.v.M. Tree up to 50 ft. and 1 ft. stem diameter. Leaves alternate ; stalks ¾–2 in. ; blades broad at base with 2 minute glands and a pair of lateral nerves at base, underside paler with numerous minute yellow glands and sometimes hairy, 1½–3½ in. long, 1½–2 times as long as broad. Capsule 2- or 3-lobed, similar to that of *M. philippinensis* but covering yellowish red.—Clarence River (Benth.) to Rockhampton (Benth.).

Mallotus ricinoides Muell. Arg. is a tall shrub or spreading tree up to 20 ft. high ; young parts and underside of leaves velvety ; leaf-stalks 1½–8 in. ; blades broad and round but pointed at apex, up to 10 in. long and 9 in. broad ; fruit 3-lobed, densely covered by soft processes up to ⅜ in. long, seed 1 in each cell.—Gympie to Cairns ; East Indies ; Southern China.

8. MACARANGA.

Macaranga Tanarius Muell. Arg. Shrub or tree up to 20 ft. high and 1 ft. stem diameter ; often common as secondary growth in felled scrub. Leaves alternate, stalks 3–8 in. inserted within margin of leaf-blade ; blade broad and round in outline but pointed at apex, 3½–8 in. long, with about 9 main nerves radiating from insertion of stalk, underside with minute, scattered yellow glands and sometimes hairy. Capsule mostly 3-lobed and 3-celled, about ½ in. in diameter, furnished with a number of processes ⅛–¼ in. long, 1 seed in each cell.—Tweed River (Benth.) to Cooktown ; Papua ; South-eastern Asia.

9. BALOGHIA.

Baloghia lucida Endl. The red-coloured juice, which exudes from the bark and stains it, suggested the common name. Scrub Bloodwood, Ivory Birch. Figs. 132 and 133.

Derivation.—Baloghia after Dr. Joseph Balogh ; *lucida* Latin, shining, referring to the glossy upper surface of the leaves.

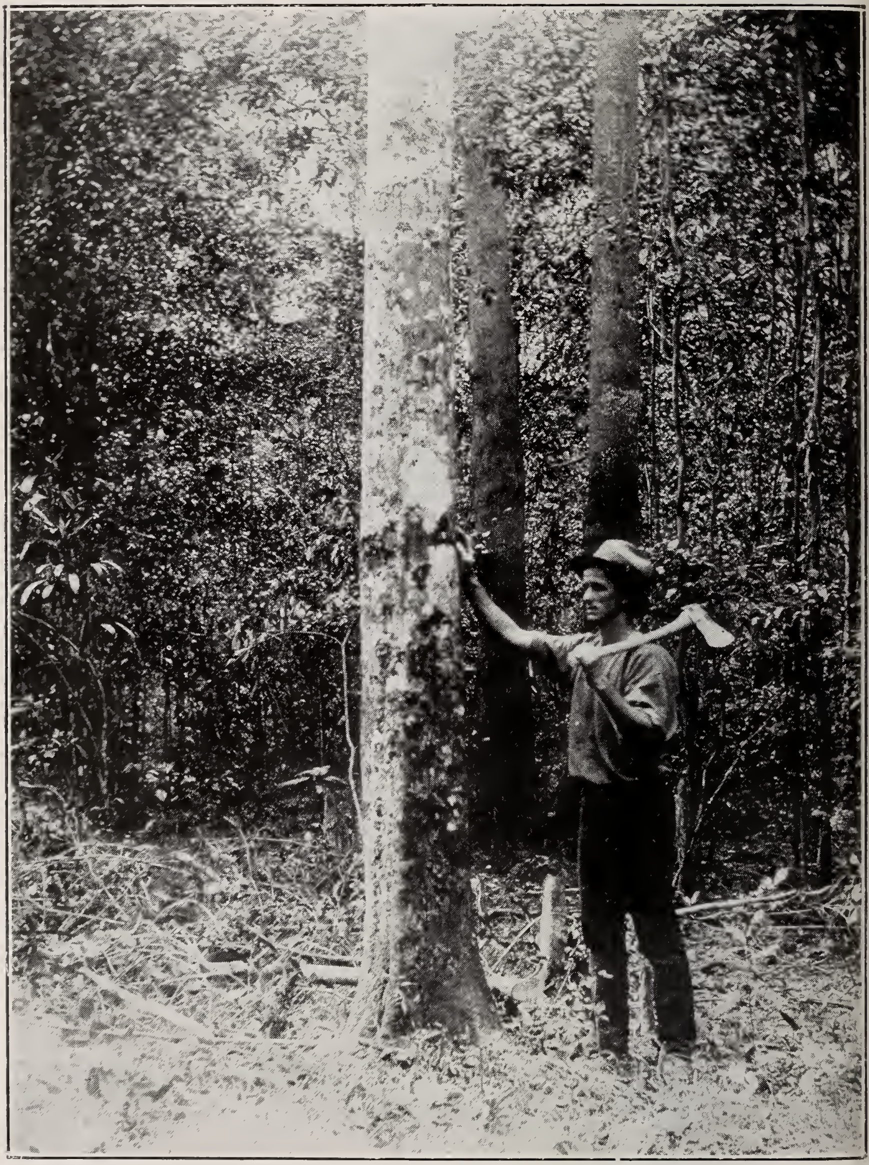


Fig. 132.—Scrub Bloodwood (*Baloghia lucida*). Imbil, about 26.4° S. The dark pustules or spots on the bark are shown.

(*Photo.: W. D. F.*)

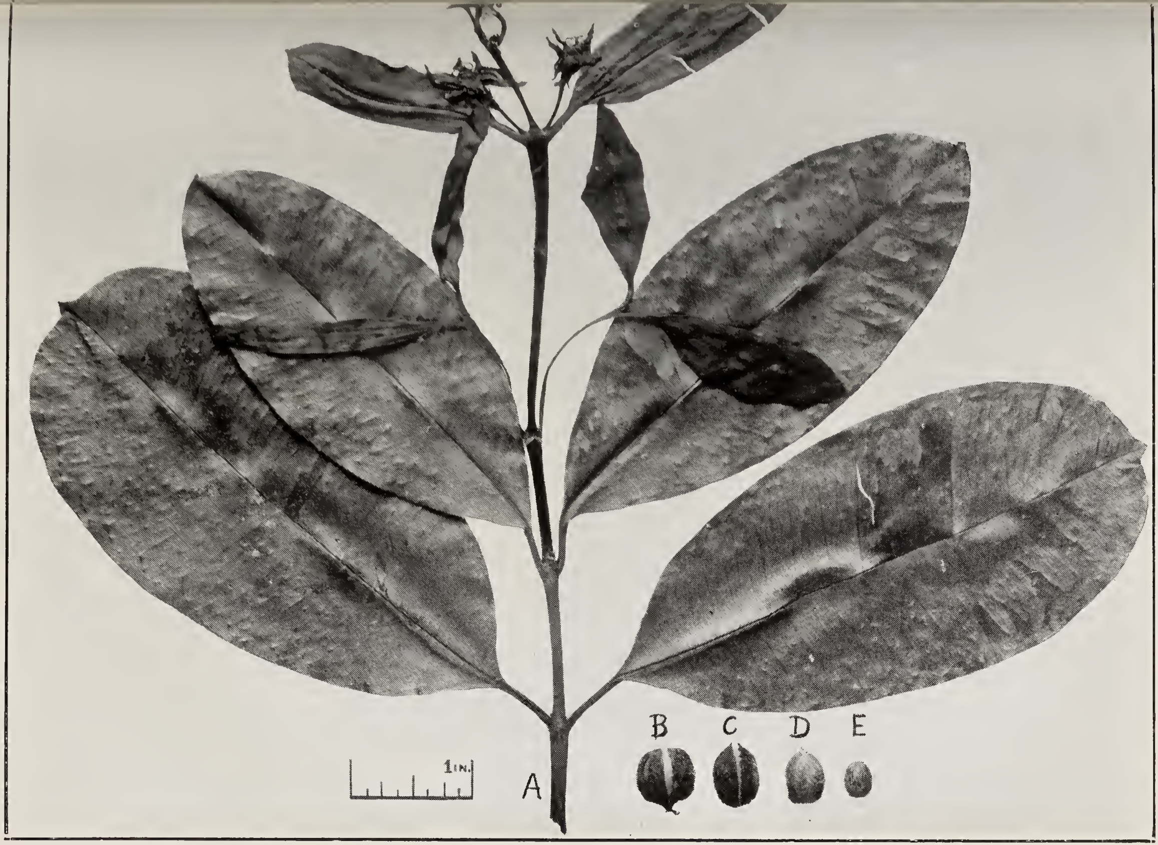


Fig. 133.—Scrub Bloodwood (*Baloghia lucida*). A, branchlet with flowers in upper part; B, dry fruit; C, separated part ($\frac{1}{3}$) of fruit; D similar to C, but with outer covering removed; E, seed. All dry material.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Description.—A tree attaining a height of 60 ft. and a stem diameter of 1 ft. Stem not prominently buttressed. Bark grey, often stained with brown and sprinkled with dark-brown irregular prominences or pustules; when cut, pinkish brown $\frac{3}{16}$ in. thick on a tree with a stem diameter of 1 ft. When the bark is cut it exudes a juice which is at first almost colourless but after a few seconds' exposure rapidly turns red. All parts hairless. Leaf-stalks ¼–⅜ in. long; leaves opposite, oval or elliptical, mostly broader at the apex which is often rounded and abruptly contracted into a short blunt point; the midrib, lateral parallel nerves (which are nearly transverse), and a few net-veins prominent on both surfaces; measurement of leaf-blade, 2½–5½ in. long, 2–3 times as long as broad. Flowers in short inflorescences (racemes) at the ends of branchlets. Male and female organs in separate flowers. Individual flowers borne on stalklets ¼–½ in. long. The outer part of the flower, the calyx, divided almost to the base into 5 or sometimes 4 or 6 oval lobes about ⅕ in. long. On the inner side of the calyx and alternating with its lobes are 5 white or cream-coloured elliptical petals nearly ½ in. long. In the centre of male flowers are numerous (over 15) slender stamens. about ⅙ in. long shortly united at the base where they are surrounded by an irregularly lobed disk. The 3-lobed ovary occupies the centre of female flowers; it is surrounded at the base by a lobed disk also. Corresponding with its lobes the ovary bears 3 styles at its summit in the centre, and each style is divided nearly to the base into 2 slender branches. Fruit about as long as broad, about ¾ in. in diameter, slightly 3-lobed and definitely 3-celled. After maturity the lobes tend to separate, and each lobe splits down the back and exposes the seed. Seeds single in each cell, oval, about ⅓ in. long. Flowering period: September and October.

Distribution.—Coastal scrubs of Eastern Australia from Illawarra, N.S.W. (Bentham). to Rockingham Bay, North Queensland. Lord Howe and Norfolk Islands and New Caledonia.

Uses.—The timber is not used extensively. It appears to be suitable for indoor fittings.

Remarks.—Dr. J. Lauterer found the dried red gum of this tree to contain 18·7% water, 4·5% arabin, and 76·8% tannin (J. Lauterer in F. M. Bailey's Botany Bulletin No. 13, p. 57, 1896). The rapid change of the colourless sap of the bark to a bright red colour as described above is probably due to the oxidation of the tannin content of the sap on exposure to the oxygen of the air.

References.—*Baloghia lucida* Endlicher, Prodromus Florae Norfolkicae, p. 84, and Iconographia, tablets 122 and 123; Bentham, Flora Australiensis, vol. vi., p. 148; F. M. Bailey, Queensland Flora, part v., p. 1439; J. H. Maiden, Forest Flora of N. S. Wales, vol. i., p. 165, plate 28; R. T. Baker, Hardwoods of Australia, p. 362, plate 119.

10. FONTAINEA.

Fontainea Pancheri Heckel. Described as a slender tree of 60 ft. Leaves alternate; stalks ¼–⅝ in. long; blades often broadest at apex, gradually narrowed at base, venation prominent, 3–5½ in. long, 2–3 times as long as broad. Fruit somewhat fleshy, egg-shaped or oval, ⅞ in. long, inner hard part more or less 4–5 valved, enclosing generally 1 egg-shaped seed ½ in. long.—Logan River to Gympie; New Caledonia.

11. EXCAECARIA.

Excaecaria Dallachyana Baill. Scrub Poison tree. Up to 50 ft. high and 1 ft. stem diameter. Bark rough or scaly. Bark and green parts when broken exuding copious milky juice which is reputed to cause irritation to the eyes. Leaves alternate; stalks ⅜–¾ in. long; blades egg-shaped or lance-shaped in outline, drawn out into point at apex, margins toothed, 1½–2¾ in. long, 2–3 times as long as broad. Capsule smooth, 3-lobed, ¼–⅜ in. diameter, 3-celled; seeds globose, single in each cell.—Richmond River (Baker) to Rockhampton.

12. HOMALANTHUS.

Homalanthus populifolius Grah. Native Bleeding-heart. Shrub or small bushy tree up to 15 ft. high. Old leaves on tree often turning deep red or crimson. Leaves alternate; stalks ⅝–3½ in.; blades very broad at base, gradually tapering towards apex, underside often paler and with more prominent venation; 2–4¾ in. long, from as broad as long to 1½ times as long as broad. Capsule 2-lobed and 2-celled, ¼–⅜ in. long, with 1 seed in each cell.—East Gippsland (Benth.) to Johnstone River; Papua; East Indies; Lord Howe and Norfolk Islands.

Homalanthus stillingiaefolius F.v.M. Closely resembles the preceding species but is distinguished by the shorter appendage of the seed (caruncelus). In *H. populifolius* the seed is enveloped by an arillus.—Manning River (Benth.) to Gympie.

Family ANACARDIACEAE.

Fruit globose, dark brown, glossy, about $\frac{1}{2}$ in. diameter. Bark very scaly. Heartwood bright yellow	1. *Rhodosphaera.*
Fruit obliquely egg-shaped, $\frac{1}{4}$–$\frac{1}{3}$ in. long. Bark often somewhat fissured. Heartwood pale or pink	2. *Euroschinus.*
Fruit 1–2 in. across, purplish when ripe, fleshy outside : inner hard part 10–12-celled. Heartwood dark brown, hard, and heavy	3. *Pleiogynium.*

1. RHODOSPHAERA.

Rhodosphaera rhodanthema Engl. Deep Yellow-wood, Yellow Cedar, Tulip Satinwood. Figs. 134 and 135.

Derivation.—Rhodosphaera from Greek *rhodon*, rose ; *sphaera*, a ball (apparently refers to red, ball-shaped fruits (Engler, the founder of the genus and species, describes the fruit of the tree as reddish) ; rhodanthema from Greek *rhodon*, rose ; *anthos*, a blossom (alluding to the red flowers).

Description.—A tree attaining a height of 70 ft. and a stem diameter of 1 ft. 6 in. Stem not prominently buttressed. Bark grey or brown, very scaly, shed in rectangular or rounded scales, brown beneath the scales ; when cut bright red or pink, exuding a viscid white or cream-like gum, measuring $\frac{3}{8}$ in. thick on a tree with a stem diameter of 1 ft. 6 in. Sapwood pale and often very thick. Heartwood bright yellow or yellowish brown when first cut. Branches spotted with raised dots (lenticels). Young shoots downy with rust-coloured hairs, which are very prominent on shoots of seedlings and young trees. Leaves alternate, pinnate, consisting of 4–13 leaflets. Each leaflet has the appearance of an ordinary leaf, and is borne on a short stalklet about $\frac{1}{8}$ in. long. The blade of the leaflet is narrowly egg-shaped or lance-shaped in outline, drawn out into a blunt point at the apex, often unequal-sided at the base, midrib and lateral nerves visible on both surfaces, sometimes there are minute tufts of hairs on the underside where the lateral nerves join the midrib ; measurement of leaflet blade 2–3 in. long, 2–3 times as long as broad on adult trees. Leaflets of seedlings and coppice ("sucker") shoots often have lobed margins. Flowers bright red in colour, in large inflorescences (panicles) at the ends of branchlets. Male and female flowers often on separate trees. Individual flowers about $\frac{1}{4}$–$\frac{3}{8}$ in. diameter when expanded, borne on stalklets about $\frac{1}{16}$ in. long. Lowermost part of the flower, the calyx, cup-shaped, about $\frac{1}{8}$ in. in diameter, the rim divided into 5 lance-shaped lobes about $\frac{1}{24}$ in. long and tipped with pink. On the inner side of the calyx and alternating with its lobes are 5 oval bright-red petals each about $\frac{1}{8}$ in. long. On the inner side of the petals are 8–10 stamens, the anthers of which are yellow and oval in shape and measure about $\frac{1}{24}$ in. long ; the filaments which bear the anthers are colourless, about $\frac{1}{24}$ in. long, and are inserted on the outside and below the margin of a shallow, concave disk. The ovary, which is absent or rudimentary in male flowers, is situated in the centre of female flowers, is almost globular, and bears at its summit 3 styles terminated by thickened stigmas. Fruit in dense bunches (panicles), each fruit globular, dry, brown and shining, about $\frac{1}{2}$ in. in diameter, containing a single seed enclosed in a very hard substance (putamen). Seed flattened (compressed), about $\frac{3}{8}$ in. broad. Flowering period : September and October.

Distribution.—Scrubs from Clarence River, N.S.W. (Bentham), to Maryborough, Queensland, extending inland to Bunya Mountains (about 100 miles from coast).

Remarks.—The trees in the luxuriant rain forests are often small and under 50 ft. in height. Tall, straight-stemmed trees are frequently found in the less luxuriant rain forests of drier areas such as those of Rosewood and Nanango, Queensland.

Uses.—The timber is of a pleasing pale-yellow colour and should be useful for cabinet-work. The panicles of dry fruits are sometimes placed in vases and used for ornamental purposes. A. G. Perkin (Trans. Chem. Soc. 71, 1195, 1897) states that the colouring matter of the wood is fisetin.

References.—*Rhodosphaera rhodanthema* Engler in Botanische Jahrbucher, i., 423; *Rhus rhodanthema* F.v.Mueller in Bentham's Flora Australiensis, vol. 1, p. 489, 1863.

2. EUROSCHINUS.

Euroschinus falcatus Hook. f. Ribbonwood, Maiden's Blush, Cudgerie (more generally applied to *Flindersia Schottiana*), Blush Cudgerie. Figs. 136 and 137.

Derivation.—Euroschinus from Greek *euros*, south-east wind ; *schinos*, the Mastic tree (probably refers to the tree as a south-eastern *Schinus*) ; *falcatus*, Latin, sickle-shaped (alluding to the unequal-sided leaflets).

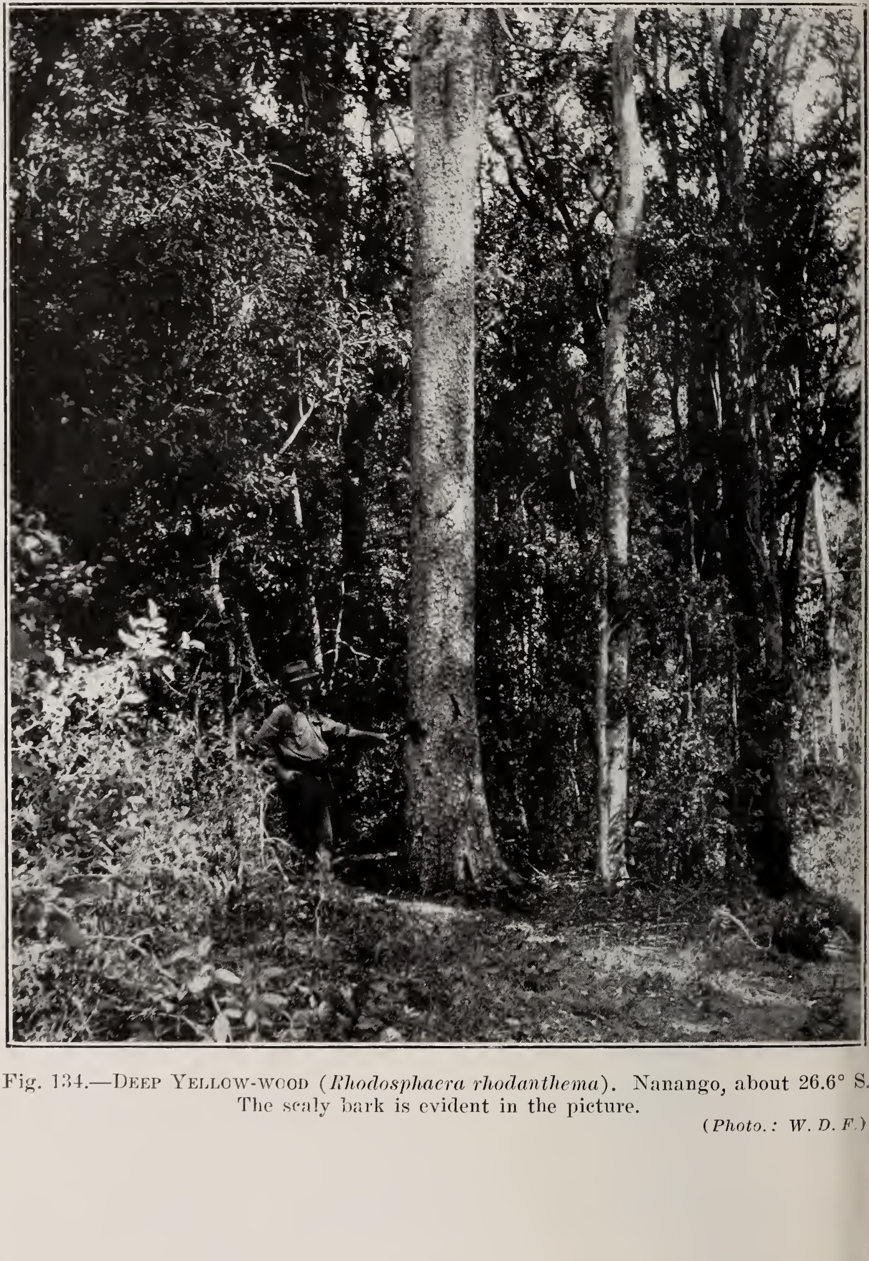


Fig. 134.—Deep Yellow-wood (*Rhodosphaera rhodanthema*). Nanango, about 26.6° S. The scaly bark is evident in the picture.

(*Photo.: W. D. F.*)

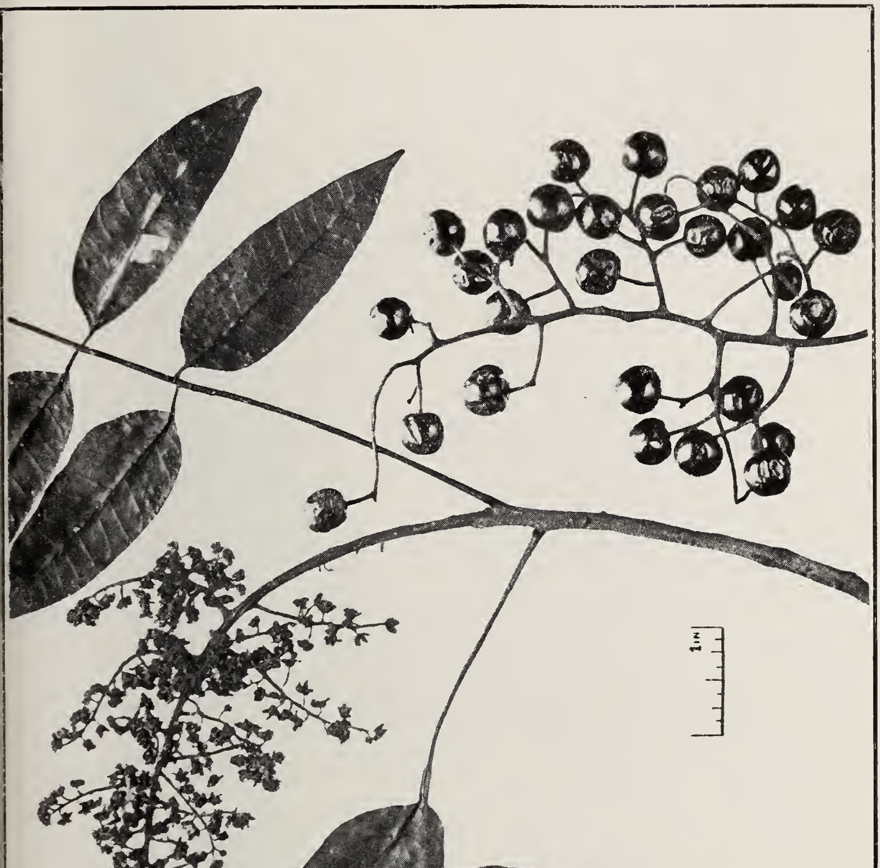


Fig. 135.—Deep Yellow-wood (*Rhodosphaera rhodanthema*). Flower-bearing branchlet; on right fruit-bearing twig. All in dry state.
(*Photo.: Dept. Agric. and Stock, Brisbane.*)

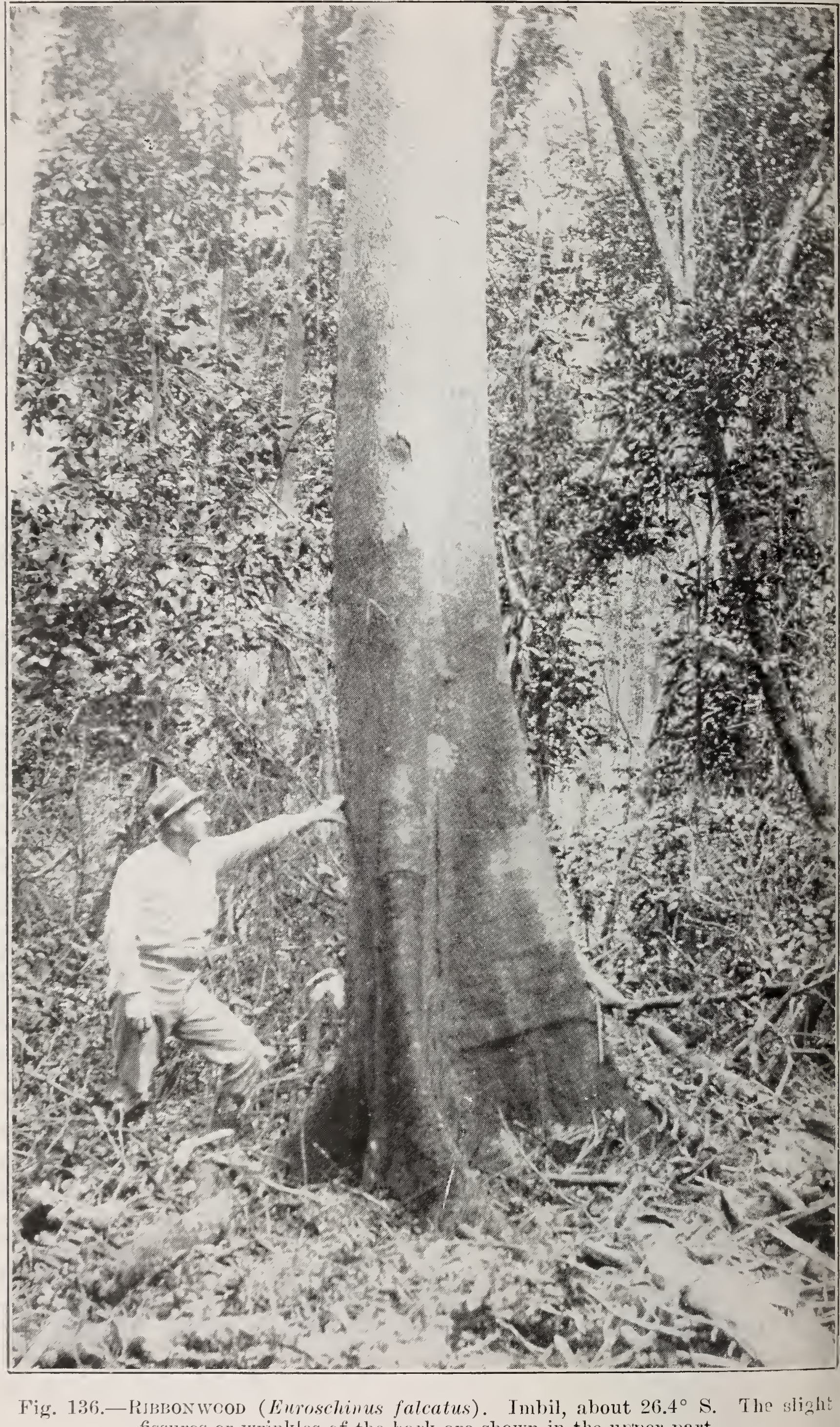


Fig. 136.—Ribbonwood (*Euroschinus falcatus*). Imbil, about 26.4° S. The slight fissures or wrinkles of the bark are shown in the upper part.

(*Photo.: W. D. F.*)

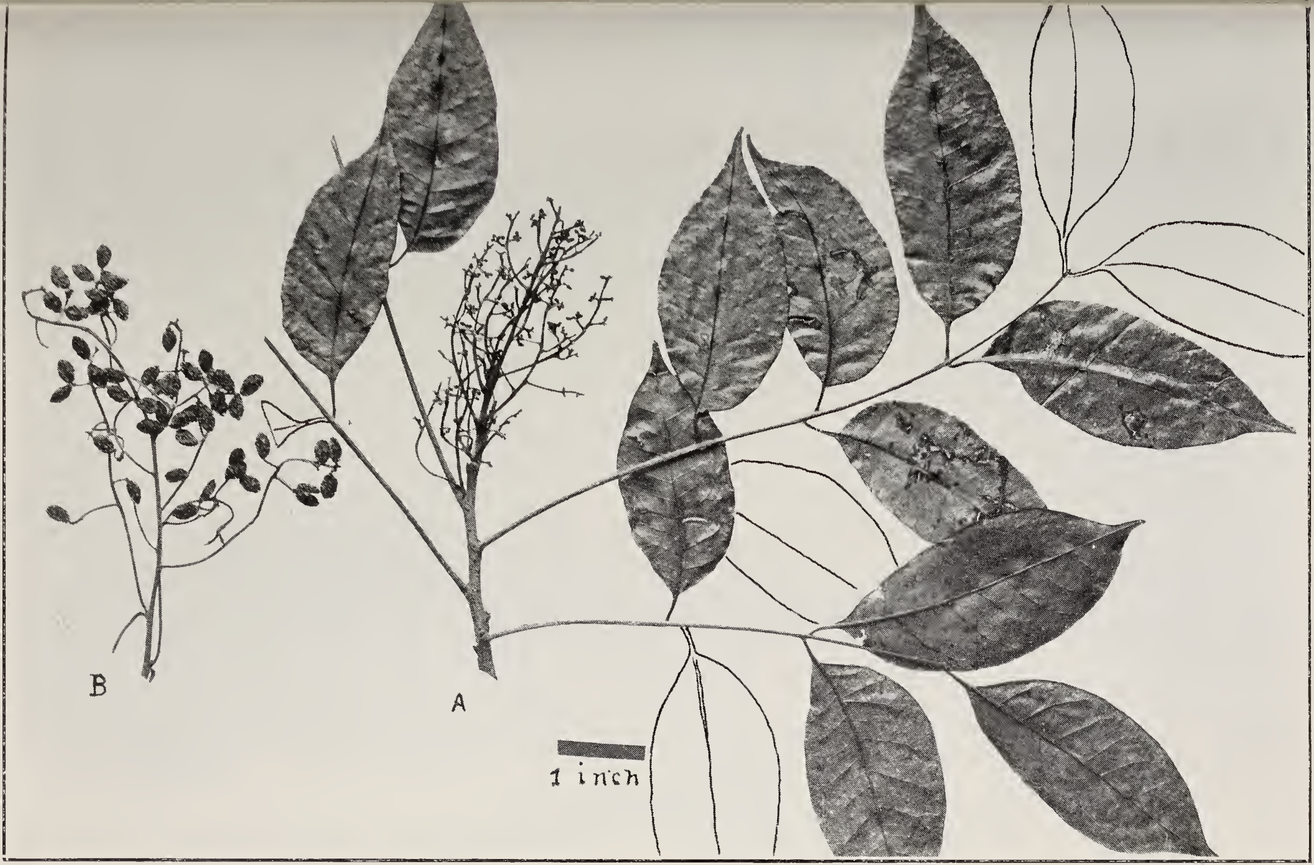


Fig. 137.—Ribbonwood (*Euroschinus falcatus*). A, flower-bearing branchlet; B, fruit-bearing twig. All dry material.
(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Description.—A tree attaining a height of about 130 ft. and a stem diameter of about 3 ft. Stem often flanged at the base in larger trees. Bark brown, often finely scaly and wrinkled; when cut pinkish brown, measuring $\frac{1}{2}$–$\frac{5}{8}$ in. thick on a tree with a stem diameter of about 3 ft. Sapwood white. All parts of the tree hairless except the very young shoots and branches of the inflorescence which are clothed with a few fine hairs. Branchlets dotted with raised spots (lenticels) smaller than a pin's head. Leaves alternate, pinnate, consisting of 4–10 leaflets. Each leaflet has the appearance of an ordinary leaf, is unequal-sided, egg-shaped or elliptical in outline, protracted into a long point at the apex, and is borne on a stalklet varying from $\frac{1}{4}$–$\frac{3}{8}$ in. long; midrib and lateral nerves alone prominent on the upper surface; measurement of leaflets, 2–4 in. long, 2–3 times as long as broad. Flowers in large inflorescences (panicles) at the ends of branchlets or sometimes springing from the forks of the upper leaves, the panicles generally shorter than the leaves. Flowers stalkless or nearly so, about $\frac{1}{5}$ in. in diameter when expanded. Perfect male and female organs often in separate flowers. The lowermost part of the flower, the calyx, is cup-shaped, less than $\frac{1}{16}$ in. in diameter, with 5 round lobes at its rim. Above or on the inner side of the calyx and alternating with its lobes are 5 petals each about $\frac{1}{12}$ in. long. On the inner side of the petals and shorter than them are 10 fine, bristle-like stamens. The ovary, in the centre of the flower, is narrowly egg-shaped, at least in the male flowers. Fruit obliquely egg-shaped $\frac{1}{4}$–$\frac{1}{3}$ in. long, containing a single seed. Flowering period: About November.

Distribution.—Common in the coastal scrubs from N. S. Wales border to the Endeavour River; extending inland as far as the Bunya Mountains (about 100 miles from the coast) and Stannary Hills (about 60 miles inland from Cairns). N. S. Wales as far south as the river Hastings (Bentham).

Uses.—When properly seasoned the timber should be useful for general indoor fittings and cabinet-work.

Reference.—*Euroschinus falcatus* Hooker f. in Bentham and Hooker's Genera Plantarum, vol. i., p. 422, 1862–1867.

Euroschinus falcatus Hooker f. var. **angustifolius** Bentham, Flora Australiensis, vol. 1, p. 491, 1863.

Description.—Leaves narrower and drawn out into a longer point and the flowers rather larger than in the typical species.

Distribution.—Rockhampton, Stannary Hills, Northumberland Ids.

Uses.—The timber resembles that of the typical species and could be applied in the same ways.

3. PLEIOGYNIUM.

Pleiogynium Solandri Engler. Burdekin Plum. Tree attaining 80 ft. in height and 18 in. stem diameter. Bark brown, somewhat scaly, very dark red when cut. Heartwood dark or dark brown, often streaked, hard; a very ornamental cabinet wood. Leaves alternate, pinnate, and consisting of 3–11 leaflets. Leaflet stalklets $\frac{1}{8}$–$\frac{1}{4}$ in. Leaflet blades egg-shaped or lance-shaped in outline, often unequal-sided, 2–4$\frac{1}{2}$ in. long, 2–3 times as long as broad. Flowers in panicles in the forks of the upper leaves. Male and female parts mostly in separate flowers and on separate trees. Calyx small, $\frac{1}{12}$–$\frac{1}{8}$ in. in diameter, its rim 5-lobed. Petals mostly 5, egg-shaped in outline, about $\frac{1}{12}$ in. long. Stamens (in male flowers) 10–8, $\frac{1}{12}$ in. long. Ovary (in female flowers) subglobose, bearing towards apex 10–12 short styles. Fruit large and fleshy, almost purple when ripe, 1–2 in. in diameter; inner hard part large, 10–12-celled, with 1 seed in each cell when perfect.—Maryborough to North Queensland; Papua.

Family CELASTRACEAE.

Fruit splitting open. Leaves alternate.
  Leaf margins toothed or entire. Capsule mostly 2-valved and 2-celled; seeds 1–2 in each cell .. .. 1. *Celastrus.*
  Leaf margins toothed or entire. Capsule woody, 3–4 celled and 3–4 valved; seeds 2–1 in each cell .. .. .. 2. *Denhamia.*
  Leaf margins entire. Flowers and stalks deep red, single or in groups on stem, branches, or twigs. Capsule up to 1 in. long, 3–5 celled; seeds 2–3 in each cell .. .. .. 3. *Hedraianthera.*
Fruit not splitting open, fleshy or hard.
  Leaves opposite, margins toothed or entire. Fruit oval, inner hard part 1–3 celled. Seed 1 in each cell .. .. .. 4. *Elaeodendron.*
  Leaves alternate, mostly entire. Fruit globose, containing numerous nutlets imbedded in a hard granular substance .. 5. *Siphonodon.*

1. CELASTRUS.

Celastrus dispermus F.v.M. Orange Bark. Tree up to 40 ft. high. When outer layer of bark is removed it often exposes a thin layer of a deep-orange colour. Branchlets with numerous minute raised spots (lenticels). Leaves alternate ; stalks ¼–½ in. ; blades mostly pointed at apex, gradually narrowed towards base, 2½–3¾ in. long, 2–3 times as long as broad. Capsule yellow, pear-shaped, ⅜–½ in. long, opening in 2 valves, 2-celled and containing 2 or 1 seed. Seeds dark brown and glossy, egg-shaped, almost ¼ in. long.—Gympie to Atherton Tableland ; N. S. Wales (Maid. and Betche).

Celastrus bilocularis F.v.M. Small tree. Branchlets with minute raised dots (lenticels). Allied and similar to *C. dispermus*, but the capsules are smaller (up to ¼ in. long), the flowers 5-merous (4-merous in *C. dispermus*) and the leaves often sharply toothed on the margins. This species is further distinguished from *C. dispermus* by the thin fleshy covering (arillus) enveloping the seeds ; in *C. dispermus* only the extreme basal portion of the seed is covered.—Northern Rivers, N.S.W. (Moore), to Burnett River (Benth.).

2. DENHAMIA.

Denhamia pittosporoides F.v.M. Small tree. Leaves alternate ; stalks ⅛–¼ in. ; blades narrowed at both ends, venation prominent, margins mostly toothed but sometimes entire, 2–3½ in. long, 3–5 times as long as broad. Capsule hard and woody, up to ⅝ in. in diameter, 3- or 4-celled and splitting into 3 or 4 valves ; seeds 2 or 1 in each cell. more or less enveloped with a thin fleshy covering (arillus).—Macpherson Range to Rockhampton ; N. S. Wales (Maid. and Betche).

3. HEDRAIANTHERA.

Hedraianthera porphyropetala F.v.M. (?) Shrub or tree up to 15 ft. high and 4 in. stem diameter. Bark pale. Leaves alternate ; stalks $\frac{1}{12}$–⅛ in. ; blades 2¾–4½ in. long, 3–4 times as long as broad, often pale or yellowish green. Flowers and stalks deep red or purple, single or in groups springing from stem, branches, or branchlets ; they are remarkable on account of the extremely short filaments of the stamens. Fruit on slender stalk, oval or egg-shaped, up to 1 in. long, 3–5 valved, 3–5 celled ; seeds 2–3 in each cell, ½ in. long, dark brown with white border (arillus) on one side.—Currumbin to Gympie. The species is recorded for N. S. Wales by Maiden and Betche.

4. ELAEODENDRON.

Elaeodendron australe Vent. Small tree. Leaves opposite, stalks ⅛–¼ in. ; blades with toothed rarely entire margins, apex blunt or bluntly pointed, gradually narrowed at base, 2–3½ in. long, 2–6 times as long as broad. Fruit bright red with succulent covering, oval, up to ¾ in. long, inner part very hard and contains 1–3 cells, each cell with 1 seed.—Kiama (Benth.) to Burdekin River.

Elaeodendron microcarpum White and Francis is closely allied to *E. australe* and is distinguished by its smaller leaves (1¾–2¼ in. long), 5-merous flowers (4-merous in *E. australe*), and smaller fruits (¼–⅜ in. long).—Gympie to Maryborough.

Elaeodendron melanocarpum F.v.M. resembles *E. australe* but has a black 3-celled fruit.—Macpherson Range to Cairns.

5. SIPHONODON.

Siphonodon australe Benth. Ivorywood. Figs. 138 and 139.

Derivation.—Siphonodon appears to be derived from Greek *siphon*, a hollow body ; *odon*, a tooth (the exact application is not clear) ; *australe* Latin, southern.

Description.—A tree attaining about 100 ft. in height and a stem diameter of about 15 in. Stem not prominently buttressed at the base. Bark somewhat furrowed or wrinkled, and often scaly, brownish grey ; when cut the bark is seen to be light brown, the innermost layer (next to the wood) is flesh coloured, and the outermost layer when peeled off often exposes a yellow or ochre-coloured interior. The bark measures ¼ in. thick on a tree with a stem diameter of 15 in. Wood white or yellow. Leaf-stalks ⅛–¼ in. long. Leaves alternate, hairless, rather glossy on the upper surface, dull and paler and with the veins more conspicuous beneath, mostly broad, blunt, or rounded at the apex and narrowed into the leaf-stalk. Measurement of leaf-blade 1½–3 in. long, 2–3 times as long as broad. Flowers in small inflorescences (cymes) arising from the forks of the leaves, the cymes much shorter than the leaves. Stalks of individual flowers from ¼ to over ½ in. long. The flower is about ¼ in. in diameter ; the outer part, the calyx, consists of 5 round overlapping lobes, the shorter ones less than half the length of the petals. On the inner side of the calyx are the 5 broad petals

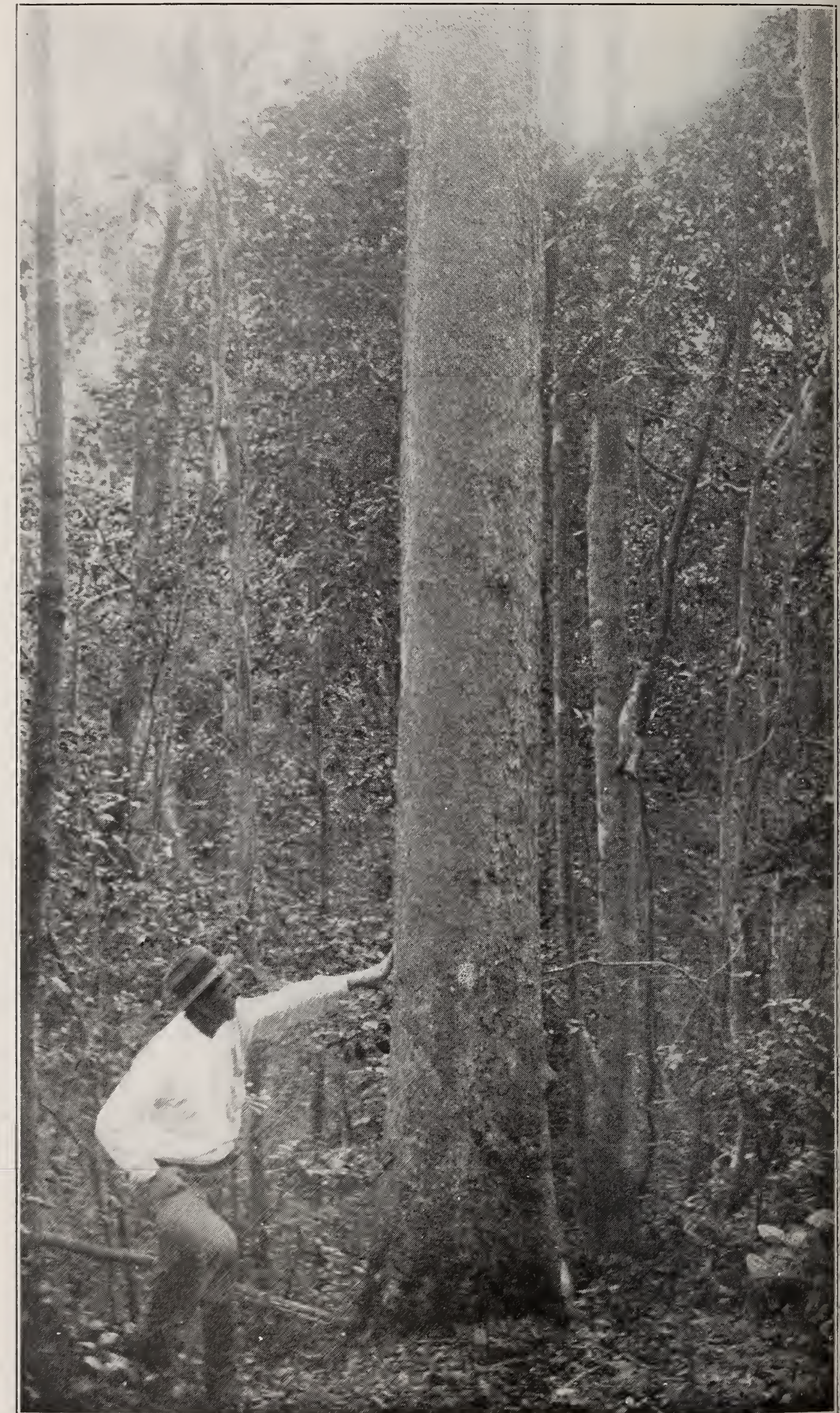


Fig. 138.—Ivorywood (*Siphonodon australe*). Imbil, about 26.4° S. The somewhat scaly character of the bark, usual in large trees, is shown.

(*Photo.: W D. F.*)

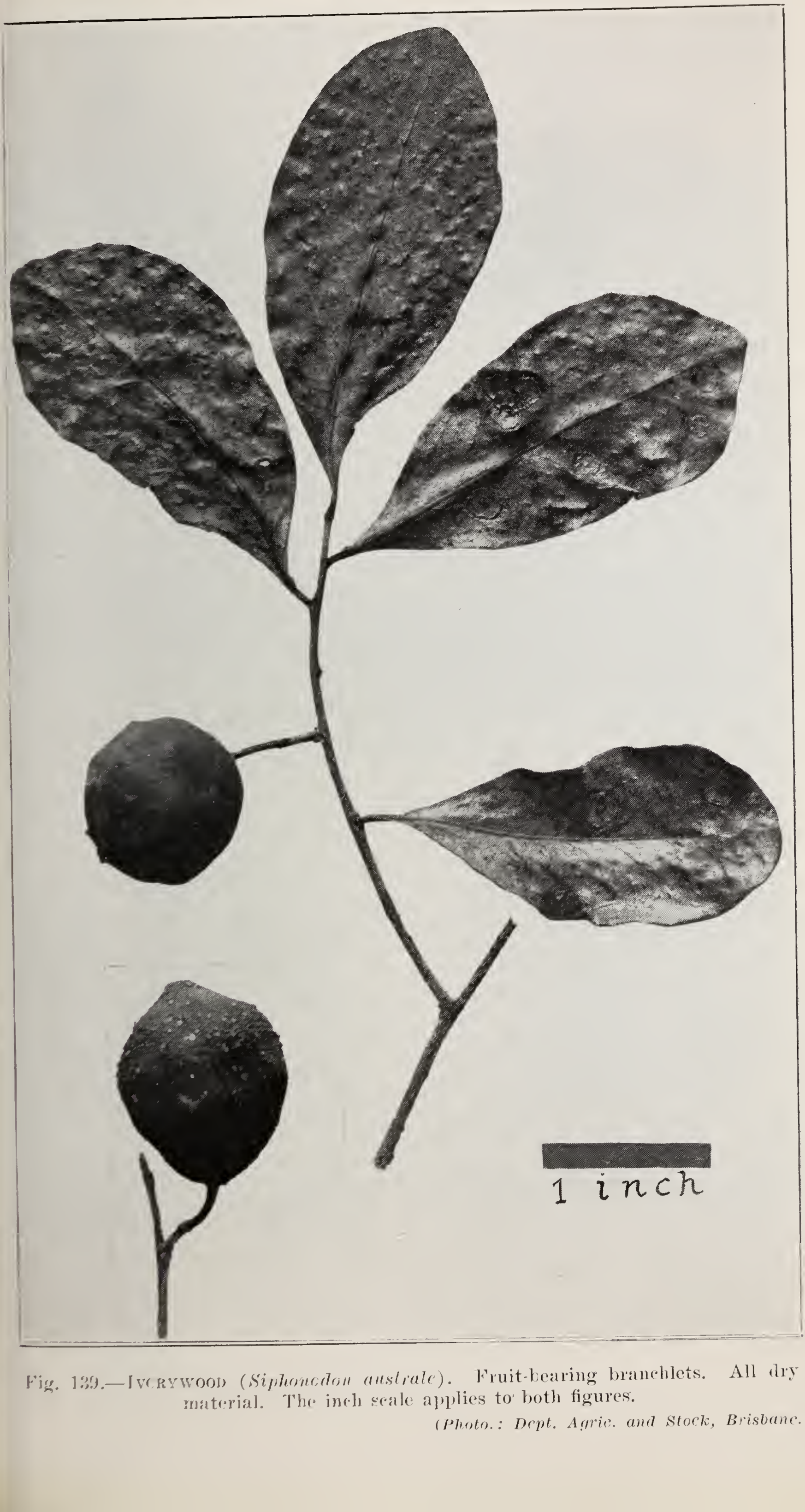


Fig. 139.—Ivorywood (*Siphonodon australe*). Fruit-bearing branchlets. All dry material. The inch scale applies to both figures.

(Photo.: Dept. Agric. and Stock, Brisbane.)

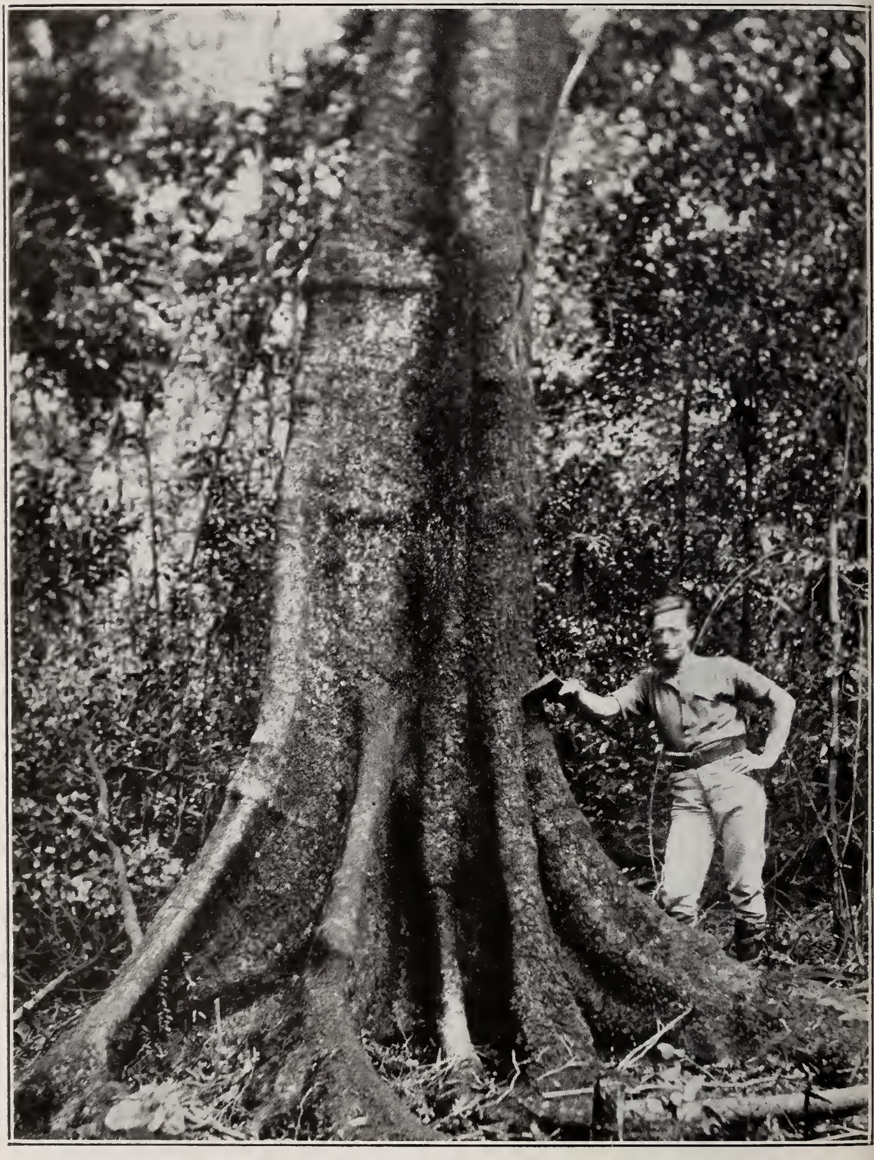


Fig. 140.—Pennantia Cunninghamii. Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

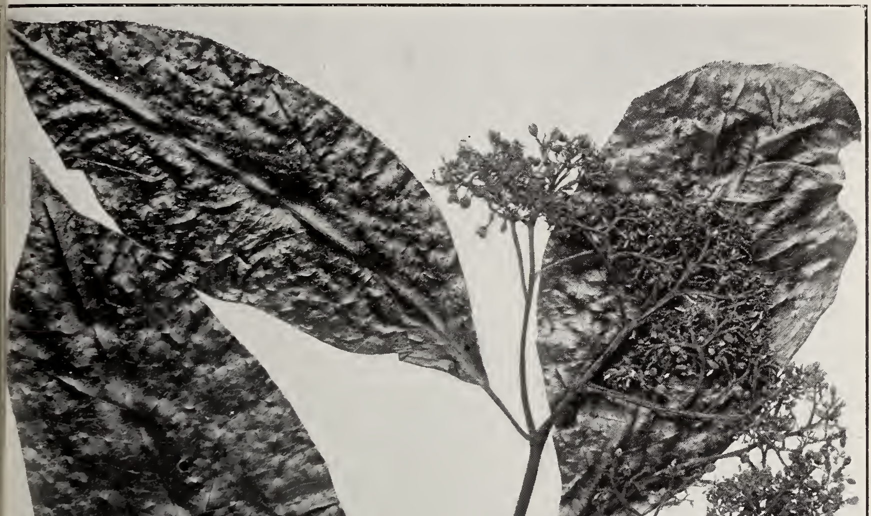


Fig. 141.—PENNANTIA CUNNINGHAMII. Inflorescence-bearing branchlet in dry state.
(Photo.: Dept. Agric. and Stock, Brisbane.)

about $\frac{1}{5}$ in. long. On the inner side of the petals and shorter than them are the 5 broad stamens surrounding the central flattened ovary, which is surmounted by a short stigmatic point inserted in a central depression of the ovary. Fruit globular or oval, hard, 1–2 in. in diameter, granular internally. When it is cut through horizontally about 10 nutlets (2 in each original cell ?) are seen in section.

Distribution.—Coastal scrubs of Northern N. S. Wales and Southern Queensland from the Clarence River on the south (J. H. Maiden) to Mt. Perry, Bundaberg district, on the north. There are specimens in the Queensland Herbarium from as far inland as Jimbour, over 100 miles from the coast.

Uses.—The timber should be useful for cabinet-work and indoor fittings.

Reference.—*Siphonodon australe* Bentham, Flora Australiensis, vol. i., p. 403, 1863.

Family ICACINACEAE.

Leaves $3\frac{1}{2}$–6 in. long. Inflorescence broad and much branched .. 1. *Pennantia.*
Leaves $1\frac{1}{2}$–4 in. long. Inflorescence very narrow, raceme-like, and slightly branched .. .. 2. *Villaresia.*

1. PENNANTIA.

Pennantia Cunninghamii Miers. Brown Beech. Figs. 140 and 141.

Derivation.—Pennantia after Thomas Pennant; Cunninghamii after Allan Cunningham.

Description.—A large tree attaining a height of 80 ft. and a stem diameter of 3 ft. Stem often irregular and leaning to one side, crooked and sometimes flanged at the base. Bark grey or brown, often somewhat scaly; when cut, reddish brown, measuring $\frac{1}{4}$ in. thick on a tree with a stem diameter of 3 ft. Sapwood white or pale yellow. Branchlets, leaves, and flowers without hairs. Leaf-stalks $\frac{1}{3}$–$\frac{1}{2}$ in. long. Leaves alternate, egg-shaped, or elliptical in outline, often protracted into a short point at the apex; measurement of leaf-blade $3\frac{1}{2}$–6 in. long, 2–$2\frac{1}{2}$ times as long as broad. The small hollow glands situated in the forks of the nerves along the midrib and at the forks of the lateral nerves where they branch towards the leaf margin are remarkable features of the underside of the leaves. Flowers in inflorescences (panicles) at the ends of the branchlets or in the forks of the leaves, the inflorescences mostly shorter than the leaves. Perfect male and female organs sometimes in different flowers. Flowers on short stalklets; calyx none or rudimentary; the outer part of the flower consists of 5 petals about $\frac{1}{8}$ in. long; on the inner side of the petals are 5 stamens about $\frac{1}{8}$ in. long; in the centre of the flower is a narrow ovary with 3 short lobes at the apex. Fruit an egg-shaped berry about $\frac{1}{2}$ in. long, containing a single seed. Flowering period: November-December.

Distribution.—Common in the coastal Queensland scrubs of the Macpherson Range, National Park, ranges about Killarney and Mt. Mistake: D'Aguilar Range, near Brisbane, is our northernmost record. N. S. Wales from Illawarra to Northern Rivers (Bentham, Flora Australiensis, i., p. 395).

Uses.—In appearance the wood somewhat resembles that of English Beech, and it has been suggested that it could be applied to similar uses. The wood of *Pennantia* is decidedly softer in texture than English Beech.

Remarks.—Coppice shoots ("suckers") are common on the stems of the trees. When crushed the fresh leaves have a faint almond-like odour. In the Flora Australiensis this species is described as a "sub-erect, tall shrub."

Reference.—*Pennantia Cunninghamii* Miers in Ann. Nat. Hist., ser. 2, ix., p. 491 (1852).

2. VILLARESIA.

Villaresia Moorei F.v.M. Churnwood, Soap Box, Silky Beech. Figs. 3, 4, 5, 142.

Derivation.—Villaresia, after Mattias Villarez; Moorei, after Chas. Moore.

Description.—A large tree attaining a height of 120 ft. and a stem diameter of 5 ft. Stem generally fluted or prominently channelled. Bark grey, fissured and cork-like; when cut brown, flesh-coloured towards sapwood, measuring $\frac{5}{8}$ in. thick on a tree with a stem diameter of $3\frac{1}{2}$ ft. Young shoots and inflorescences clothed with fine scattered hairs. Leaf-stalks about $\frac{1}{4}$ in. long. Leaves alternate, egg-shaped or lance-shaped in outline, drawn out into a point at the apex, upper surface glossy; midrib, lateral nerves, and net-veins visible on both sides, but more conspicuous on the underside; measurement of leaf-blade, $1\frac{1}{2}$–4 in. long, 2–3 times as long as broad. Inflorescence consisting of narrow panicles arising from the forks (axils) of the leaves or from the branchlets opposite to the leaves or between the leaves. The panicles measure 1–3 in.

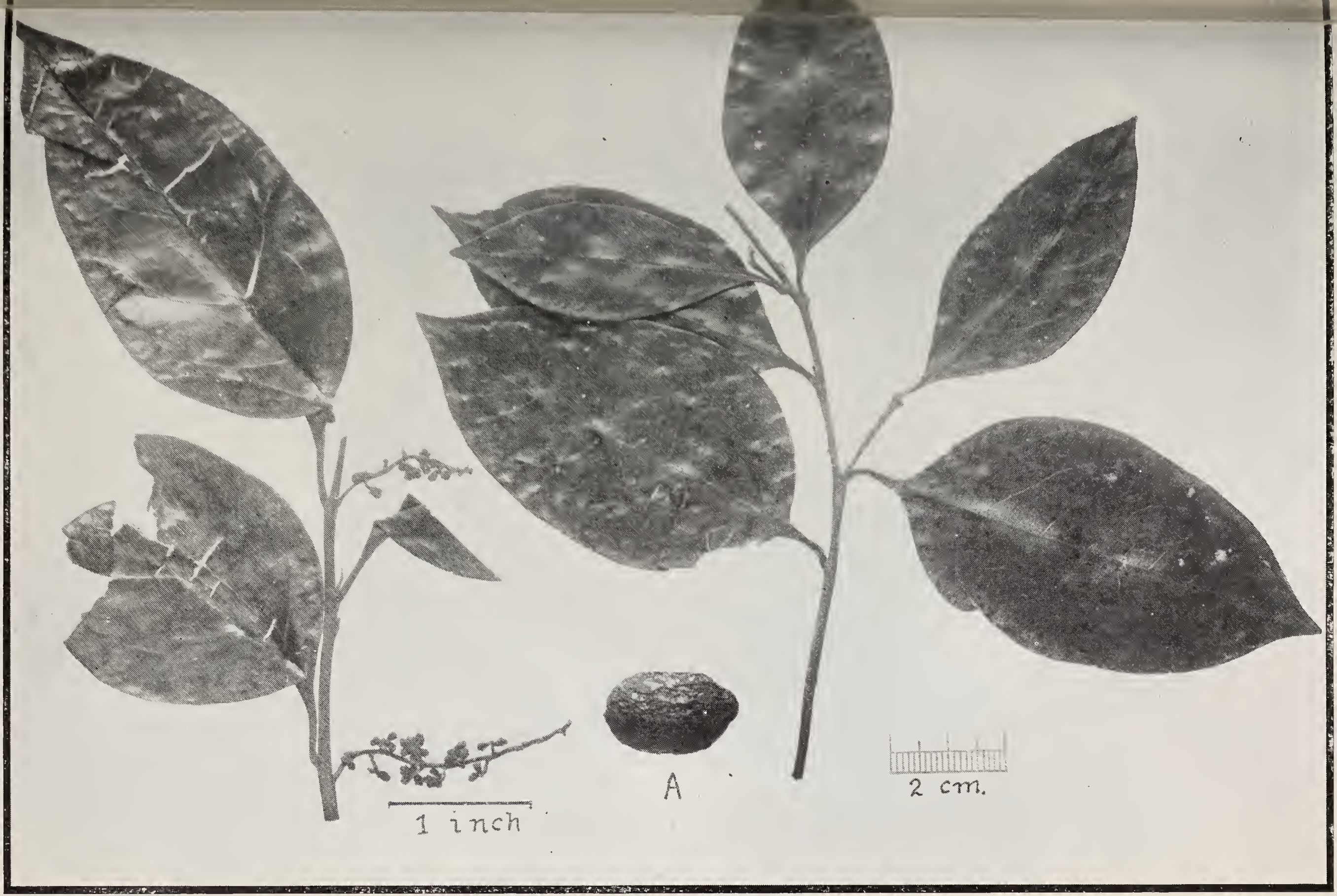


Fig. 142.—Churnwood (*Villaresia Moorei*). Inflorescence-bearing branchlet on left. A, fruit. All in dry state. The inch scale applies to all figures. Figure of stem on page 13.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

long and have short branches $\frac{1}{6}$–$\frac{1}{4}$ in. long, each branchlet bearing a cluster of 3–7 stalkless flowers. Each flower measures about $\frac{1}{6}$ in. long. The lowermost part of the flower, the calyx, is cup-shaped or bell-shaped, hairy, and is less than $\frac{1}{12}$ in. long; it bears 5 broadly triangular lobes at its rim. On the inner side of the calyx are the 5 narrow, hairless petals bearing inflexed apices and measuring $\frac{1}{8}$ in. long. Alternating with the petals and about the same length are 5 slender stamens with yellow anthers less than $\frac{1}{24}$ in. long. The hairy ovary is egg-shaped and tapers at its apex into a hairless style about $\frac{1}{12}$ in. long. The style bears a lobed stigma at its apex. Fruit oval or globular, almost 1 in. long, black, the outer part succulent, inner part hard, enclosing 1 large seed which is traversed lengthwise by the hard part of the fruit projecting into the centre of the seed cavity and forming a partial dissepiment. Flowering period: September.

Distribution.—Coastal scrubs from Shoalhaven River, N.S.W., to Gympie, Queensland.

Uses.—The timber is pale in colour and has conspicuous rays. It has been used recently for case-making.

References.—*Villaresia Moorei* F.v.Mueller in Bentham's Flora Australiensis, vol. 1, p. 396, 1863; *Chariessa Moorei* Engler in Engler and Prantl's Naturlichen Pflanzenfamilien, iii., v., 245, 1896.

Family SAPINDACEAE.

The determination of the species of this family is often very difficult and frequently necessitates reference to herbarium specimens. The following synopsis of the genera in some cases is not very satisfactory; more reliance should be placed upon the descriptions of the individual species.

Fruit carpels or lobes extended upwards into a thin, prominent wing	1. *Atalaya.*
Fruit cells each containing a large (up to 1 in. broad) seed ..	2. *Castanospora.*
Fruit cells opening transversely	3. *Alectryon.*
Fruit cells opening along the back in longitudinal slits.	
Fruit mostly 3-lobed; lobes flattened (compressed) and often angular at outer edge	4. *Guoia.*
Fruit often 3-lobed. Leaflets toothed or entire; in some species broadest towards apex	5 *Cupaniopsis.*
Disk of flower more strongly developed on one side	6. *Diploglottis.*
Dry fruit often prominently 3-angled. Leaflets pointed at apex: venation raised and brown on underside	7. *Sarcopteryx.*
Fruit bluntly 3-angled, covered with rigid rust-coloured bristles	8. *Jagera.*
Dry fruit (where known) pear-shaped, angular, 2- or 3-lobed ..	9 *Toechima.*
Fruit very hard and woody	10. *Elattostachys.*
Fruit consisting of 3–1 rounded or egg-shaped lobes, which are often almost distinct from each other	11. *Arytera.*
Fruit pear-shaped, often on fairly long stalklet (stipitate). Leaflets entire	12. *Mischocarpus.*
Fruit with two large, papery or leathery, often inflated lobes	13. *Harpullia.*

1. ATALAYA.

Atalaya hemiglauca F.v.M. Whitewood. Tree up to 60 ft. and 18 in. stem diameter. Leaflets 2–10, the axis to which they are attached often expanded or winged; stalklets of leaflets scarcely distinct; leaflet blade mostly paler beneath, 3–5 in. long, 3–8 times as long as broad. Fruit consisting of 3 carpels, each carpel when developed extended upwards into a thin wing, the lower seed-containing part hairy outside, carpel up to 1½ in. long including wing which measures ½ in. in breadth.—Brisbane to Rockhampton; interior of Queensland and Northern N. S. Wales; North Australia; North-west Australia. The "Kimberley disease" and "walk-about disease" in horses are considered to be due to ingestion of green parts of this plant.

2. CASTANOSPORA.

Castanospora Alphandi F.v.M. Up to 50 ft. high and 1 ft. stem diameter. Leaflets on flowering branchlets 8–10 to each leaf. Leaflet stalklet $\frac{3}{8}$–$\frac{1}{2}$ in.; blade paler on underside, venation fine and prominent, 4–6 in. long, 3–4½ times as long as broad. Capsule about 1¼ in. diameter, the outer covering (pericarp) downy on inside, cells 2 with a large (almost 1 in. broad) seed in each.—Bellinger River (F.v.M.) to Cairns.

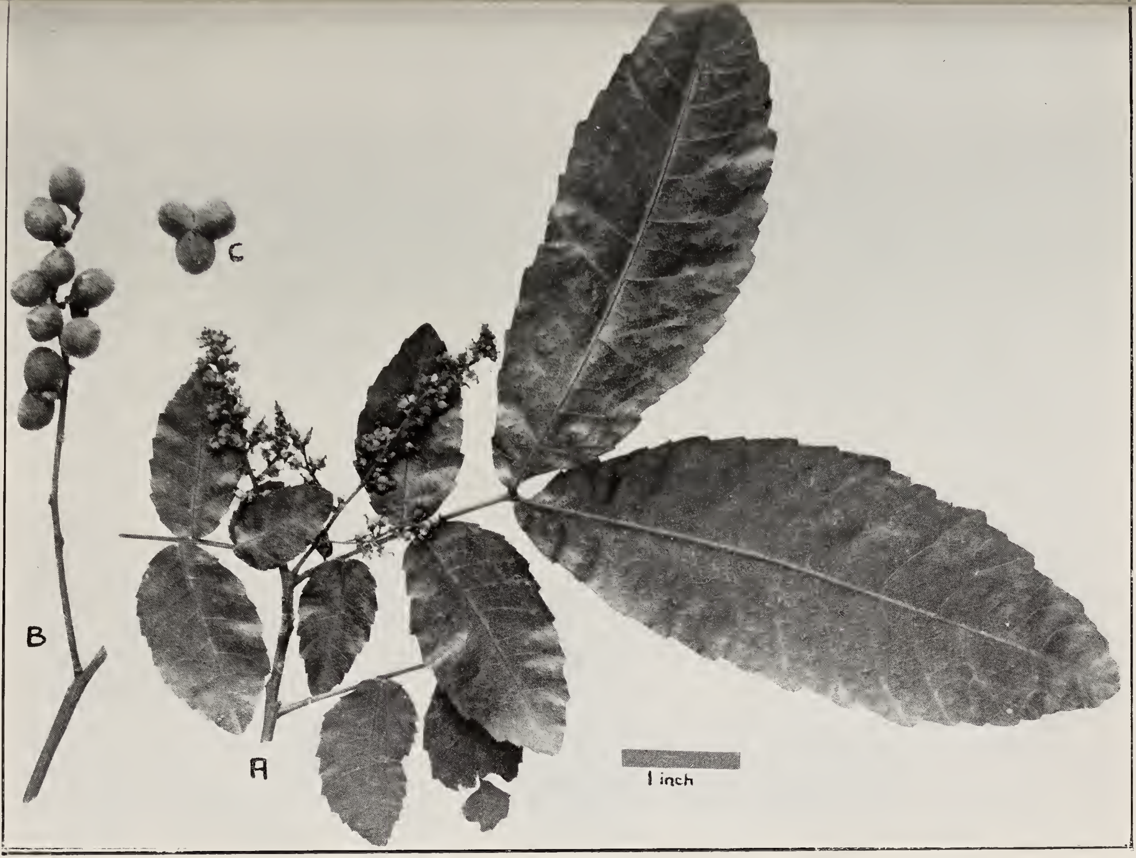


Fig. 143.—ALECTRYON TOMENTOSUS. A, inflorescence-bearing branchlet (fresh state); B, fruit-bearing twig; C, fruit from above.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

3. ALECTRYON.

Alectryon connatus Radlk. (*Nephelium connatum* F.v.M.). Small tree. Young branchlets finely downy. Leaflets on flowering branchlets mostly 4 (sometimes 3 or 5) to each leaf. Leaflet stalklet indistinct or up to $\frac{1}{12}$ in.; blade paler beneath, venation prominent, 2–$4\frac{1}{2}$ in. long, 2–3 times as long as broad. Fruit disk-shaped or depressed globose, $\frac{1}{2}$–$\frac{5}{8}$ in. diameter, 3- or 4-celled; seeds 1 in each cell, glossy, dark brown, $\frac{1}{8}$ in. diameter, innermost part covered by a partial arillus.—Brisbane River to Burdekin River; N. S. Wales (Maid. and Betche).

Alectryon subdentatus Radlk. (*Nephelium subdentatum* F.v.M.). Allied and similar to foregoing species but distinguished by its less hairy shoots and somewhat toothed leaflets and compressed-globose, 2-lobed fruit.—Tenterfield (Benth.) to Kilcoy, Queensland.

Alectryon Forsythii Radlk. (*Nephelium Forsythii* Maid. & Betche). Attaining 25 ft. in height and 14 in. stem diameter (Maid. & Bet.). Leaflets 2 (sometimes 4) to each leaf. Leaflet stalklet $\frac{1}{8}$–$\frac{1}{4}$ in.; blade paler beneath, venation prominent, 2–$3\frac{1}{2}$ in. long, $1\frac{1}{2}$–2 times as long as broad. Fruit 2-lobed, flattened, $\frac{3}{4}$ in. broad, $\frac{3}{8}$ in. high, about $\frac{1}{8}$ in. thick.—Walcha district, N.S.W. (Maid. and Betche).

Alectryon tomentosus Radlk. Fig. 143.

Derivation.—Greek *alectryon*, a cock (possibly in allusion to the comb-like crest on the fruit of the original species of the genus, *Alectryon excelsum*, a native of New Zealand); tomentosus from Latin, *tomentum*, a stuffing (of wool, hair, &c.) for cushions (alluding to the hairy clothing of the plant).

Description.—A small or medium-sized tree attaining a height of about 50 ft. and a stem diameter of 1 ft. Stem not buttressed. Bark fairly smooth, dark brown, when cut light brown and measuring $\frac{1}{4}$ in. thick on a tree with a stem diameter of 1 ft. Young shoots, young branchlets, young leaves, underside of older leaves, and inflorescence downy or hairy with rust-coloured hairs. Leaves alternate, pinnate, consisting of 4–8 leaflets. Each leaflet has the appearance of an ordinary leaf, is narrowly elliptical in outline, has a very short stalklet of $\frac{1}{10}$ in. or less in length; the margins are toothed; the upper leaflets are unequal-sided at the base; midrib, lateral nerves, and net-veins visible on both sides but raised and more conspicuous on the underside; measurement of leaflet blade, $1\frac{1}{2}$–5 in. long, 2–3 times as long as broad; the leaflets at the end are mostly larger than those below. Flowers in inflorescences (panicles) arising from the forks (axils) of the leaves. Stalklets of flowers $\frac{1}{12}$ in. or less long. Each flower is about $\frac{1}{8}$ in. long. The outermost part of the flower, the calyx, is small and cup-shaped, bears 5 teeth at the rim, and measures about $\frac{1}{12}$ in. in diameter. On the inner side of the calyx are 8 small pink stamens with oval anthers about $\frac{1}{24}$ in. long and filaments slightly shorter; the filaments are inserted on the inner side of a circular disk. There are no petals in the flowers. In the centre of the flower is the 2- or 3-lobed hairy ovary surmounted at the apex by a short style branching into 2 or 3 minute, curved stigmas. Fruit covered by a very dense rust-coloured down, 1-, 2-, or 3-lobed, the lobes egg-shaped and almost $\frac{1}{2}$ in. long. Each lobe contains one large black, shining, globose seed, $\frac{1}{5}$–$\frac{1}{4}$ in. diameter. The seeds are half-enveloped in a scarlet pulp (arillus). Flowering period: August.

Distribution.—Coastal scrubs from Clarence River, N.S.W. (Bentham), to Proserpine, between Mackay and Townsville, North Queensland. It extends inland in parts of Queensland to a distance of about 100 miles from the coast.

Uses.—The species is cultivated at times as a shade and ornamental tree.

References.—*Alectryon tomentosus* L. Radlkofer in Act. Congr. Bot. Amst. 1877, 117, 1879; *Nephelium tomentosum* F.v.M. in Transactions of the Victorian Institute, vol. 2, p. 64, 1858.

Alectryon coriaceus Radlk. (*Nephelium coriaceum* Benth.). Bushy tree up to 20 ft. high. Frequent in scrubs near beaches. Leaflets mostly 2 to each leaf, sometimes up to 6; leaflet stalklet $\frac{1}{12}$–$\frac{1}{4}$ in.; blade round at apex, narrowed towards base, pale or grey beneath, $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, twice as long as broad. Capsule rusty-hairy, 3- or sometimes 4-lobed, lobes globose and about $\frac{1}{4}$ in. diameter, each lobe containing 1 glossy dark-brown seed almost $\frac{1}{4}$ in. in diameter.—Manning River (Maiden) to Maryborough.

Alectryon subcinereus Radlk. (*Nephelium leiocarpum* F.v.M.). Small tree. Leaflets mostly 4 or sometimes 6 to each leaf; leaflet stalklet $\frac{1}{8}$–$\frac{1}{4}$ in.; blade narrowed at both ends, margins sometimes toothed, venation prominent beneath, 3–6 in. long, 3–4 times as long as broad. Fruit consisting of 2 (sometimes 1 or 3) globose smooth lobes, the lobes up to $\frac{3}{8}$ in. in diameter, each lobe containing 1 glossy dark-brown or black seed up to $\frac{1}{4}$ in. diameter, and the seed half enveloped in an arillus.—Twofold Bay (Benth.) to Maryborough.

4. GUOIA.

Guoia semiglauca Radlk. (*Nephelium semiglaucum* F.v.M.). Up to 30 ft. high and 9 in. stem diameter. Leaflets 2–6 (mostly 4) to each leaf; leaflet stalklet $\frac{1}{12}$–$\frac{1}{8}$ in.; blade grey or pale beneath, rounded or sometimes pointed at apex, narrowed at base, 2–4 in. long, 2–3 times as long as broad. Capsule mostly with 3 somewhat flattened (compressed) lobes $\frac{1}{4}$–$\frac{3}{8}$ in. broad, broader than long, seeds 1 in each lobe, oval, dark-brown, $\frac{1}{5}$ in. long.—Kiama (Benth.) to Cairns.

5. CUPANIOPSIS.

Cupaniopsis Wadsworthii Radlk. (*Cupania Wadsworthii* F.v.M.). Small tree. Leaflets 4 or 2 to each leaf; leaflet stalklet scarcely distinct or up to $\frac{1}{12}$ in. sometimes swollen: blade almost triangular, narrowed at base, very broad and truncate or indented at apex, $1\frac{1}{2}$–$3\frac{1}{4}$ in. long, $1\frac{1}{3}$–$1\frac{1}{2}$ times as long as broad. Capsule described as 2- or 3-lobed, about 1 in. broad, velvety outside. Seeds described as egg-shaped, $\frac{1}{2}$ in. long, covered, except at apex, by a thin orange-coloured arillus.—Rockhampton; N. S. Wales (Maid. and Betche).

Cupaniopsis Shirleyana (*Cupania Shirleyana* F. M. Bailey). Small tree apparently allied to *Cupaniopsis Wadsworthii.* Young branchlets rusty-hairy. Leaflets 2–10 to each leaf, leaflet stalklet scarcely distinct or up to $\frac{1}{12}$ in. long; blade almost triangular, hairy below, very broad and truncate or toothed at apex, margins coarsely toothed, 1–$2\frac{1}{2}$ in. long, 2–3 times as long as broad, sometimes the leaflets are only about $\frac{1}{3}$ in. broad. Capsule apparently 3-lobed, $\frac{1}{2}$–$\frac{3}{4}$ in. long, outer covering hairy outside and thinly hairy inside. Seeds described as dark brown, somewhat pear-shaped, and more than half enveloped in a reddish arillus.—Brisbane to Bundaberg.

Cupaniopsis anacardioides Radlk. (*Cupania anacardioides* A. Rich.). Up to 40 ft. high and 1 ft. stem diameter. Leaflets 6–10 (mostly 8) to each leaf; leaflet stalklet $\frac{1}{8}$–$\frac{3}{8}$ in. long: blade broad and rounded or indented at apex, narrowed at base, $2\frac{1}{2}$–4 in. long, 2–$2\frac{1}{2}$ times as long as broad. Capsules 3- or indistinctly 6-lobed, about $\frac{3}{4}$ in. long: seeds 3 in each fruit, oval, brown or black, $\frac{1}{2}$ in. long, completely enveloped by a red arillus. The covering of the fruit is thinly hairy inside. Port Jackson (Benth.) to Townsville; North Australia.—Var. *parvifolia* F. M. Bailey. Up to 60 ft. high and 18 in. stem diameter (stem shown on right of picture of *Sideroxylon Pohlmanianum*); leaflets $1\frac{1}{4}$–$2\frac{1}{2}$ in. long, 2–3 times as long as broad; flowers and fruit of the variety are similar to those of the species.

Cupaniopsis Dunnii Maid. & Bet. (*Cupania Dunnii* Maid. & Bet.). Described as a bushy tree 40 ft. high and 18 in. stem diameter. Leaflets 2 to each leaf; leaflet stalklet indistinct or up to $\frac{1}{4}$ in.; blade broad and rounded or shortly pointed at apex, narrowed towards base, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, 2–$2\frac{1}{2}$ times as long as broad. Capsule 3-lobed, when opened and expanded 1 in. in diameter; seeds 1 in each lobe, egg-shaped, glossy, almost black, up to $\frac{1}{2}$ in. long, basal portion enclosed in a thick arillus.—Macpherson Range.

Cupaniopsis serrata Radlk. (*Cupania serrata* F.v.M.). Shrub or possibly small tree. Young branchlets rusty-hairy. Leaflets 8–12 to each leaf; leaflet stalklet $\frac{1}{8}$–$\frac{1}{4}$ in.; blade with sharp prominent teeth on margin, venation raised and prominent beneath, mostly drawn out into acute point at apex, 3–$4\frac{1}{2}$ in. long, 2–$3\frac{1}{2}$ times as long as broad. Capsule 2- or 3-lobed, $\frac{3}{4}$–1 in. broad, covered with fine dense yellowish-brown hairs; seed 1 in each lobe, dark brown and glossy, egg-shaped, $\frac{1}{2}$–$\frac{5}{8}$ in. long, greater part covered by arillus.—Clarence River to Rockingham Bay (F.v.M.).

Cupaniopsis foveolata Radlk. (*Cupania foveolata* F.v.M.). Described by F. v. Mueller as attaining 40 ft. The descriptions state that there are 5–13 leaflets to each leaf; margins of leaflets toothed, lateral nerves with small thickenings (foveolae) on underside where they join midrib; fruit 3-lobed, about $\frac{3}{4}$ in. in diameter; seeds enclosed in arillus except at apex. Evidently closely allied to *C. serrata* but differing in the much less hairy young branchlets and the blunt teeth of the leaflets.—Macleay River (F.v.M.) to Rockingham Bay (F.v.M.).

Cupaniopsis punctulata Radlk. (*Cupania punctulata* F.v.M., *Ratonia punctulata* F.v.M.). Tall shrub or possibly small tree. Leaflets 4-7 to each leaf; leaflet stalklet $\frac{1}{4}$–$\frac{1}{2}$ in.; blade egg-shaped or lance-shaped in outline, drawn out into blunt point at apex, 2–$3\frac{1}{4}$ in. long, 2–3 times as long as broad. Capsule globose or 3-lobed. $\frac{3}{8}$ in. in diameter; seeds 1 in each lobe, dark brown, flattened (compressed), elliptical, $\frac{1}{5}$ in. long, grooved at back: stalklet (stipes) of fruit up to $\frac{1}{12}$ in.—Tweed River to Proserpine.

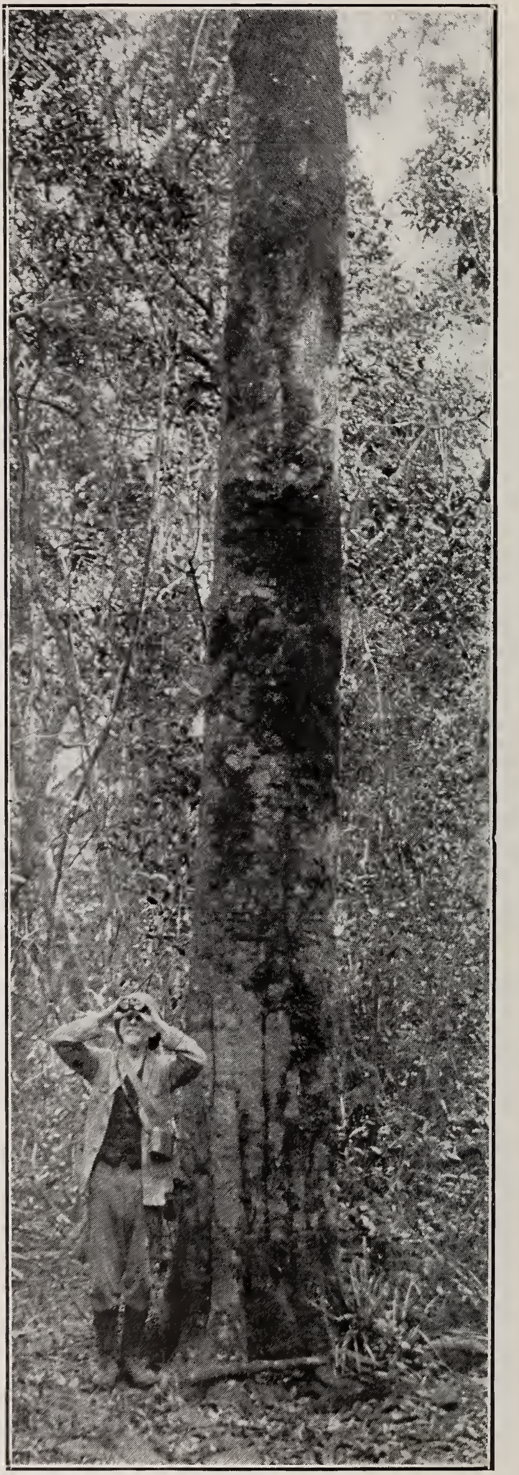


Fig. 144.—Native Tamarind (*Diploglottis Cunninghamii*). Roberts Plateau, Macpherson Range, about 28.3° S.
(*Photo.: A. H. Chisholm.*)

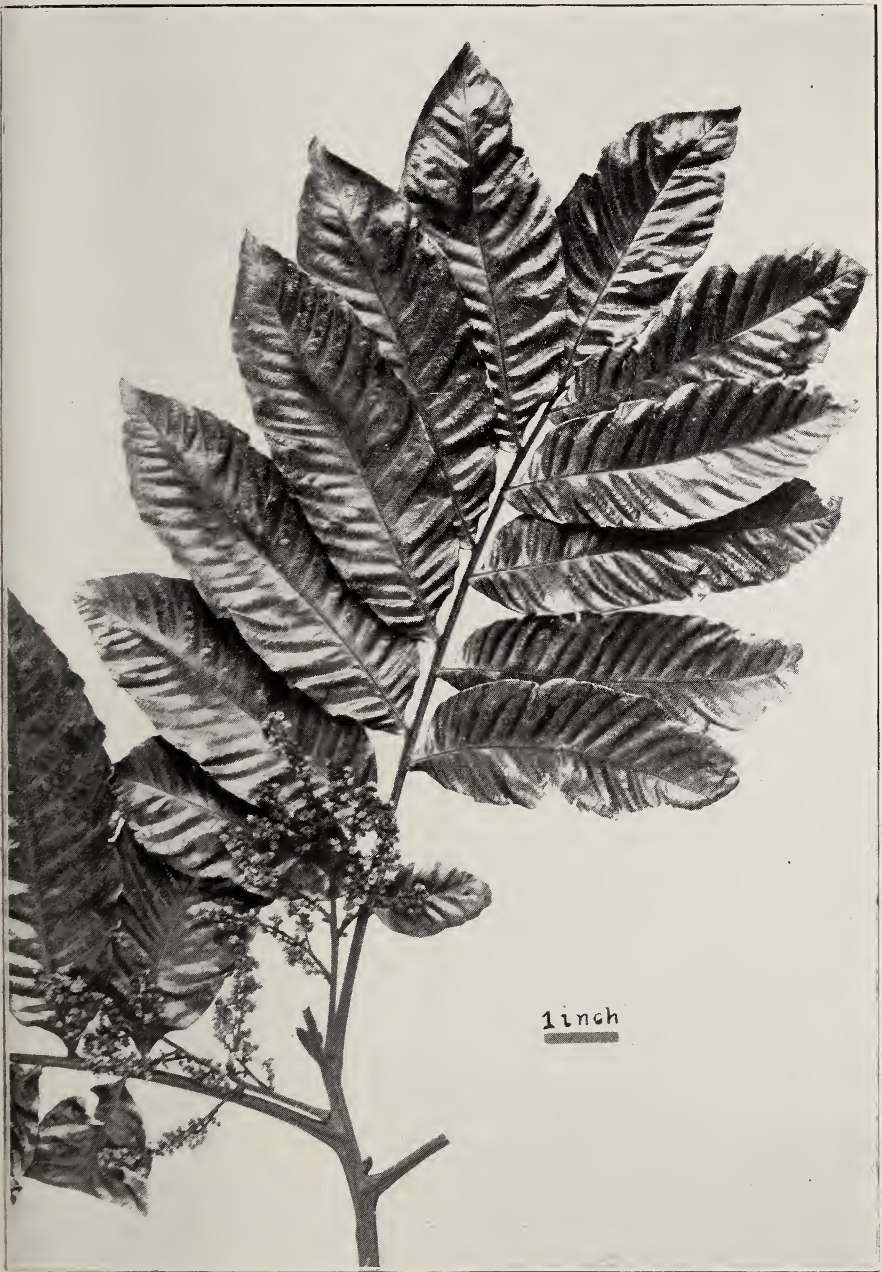


Fig. 145.—NATIVE TAMARIND (*Diploglottis Cunninghamii*). Flower-bearing branchlet, fresh state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

6. DIPLOGLOTTIS.

Diploglottis Cunninghamii Hook. f. Native Tamarind. Figs. 144 and 145.

Derivation.—Greek *diploos*, twofold, double ; *glossa* or *glotta*, the tongue (probably in allusion to the two small somewhat tongue-like glands at the base of each petal) ; Cunninghamii, after Allan Cunningham.

Description.—A tree attaining a height of 100 ft. and a stem diameter of 2 ft. Stems not prominently buttressed. Bark brownish grey, not very scaly. Young branches, leaf-stalks, and inflorescence covered with densely velvety brown hairs. Leaves alternate, very large, pinnate, consisting of 8–12 large leaflets. The leaf-stalks measure from 2 to over 3 in. in length from the lowest pair of leaflets to their insertion on the branchlets. Each leaflet has the appearance of an ordinary leaf, is borne on a short thick stalklet ¼ in. or less in length, is unequal-sided at the base and bluntly pointed or rounded at the apex, is narrowly oval or elliptical in shape, is softly hairy on the underside and has numerous parallel lateral nerves and net-veins which are raised and more prominent on the underside ; measurement of leaflet blade 5–9 in. long (or longer on luxuriant shoots), about 2½ times as long as broad. Flowers in large inflorescences (panicles) arising from the forks of the upper leaves. Individual flowers on short stalklets ⅙ in. or less in length. The outer part of the flower, the calyx, divided into 5 hairy lobes ⅛ in. long. On the inner side of the calyx are 4 petals only, each petal broad and about $\frac{1}{12}$ in. long, and with 2 hairy scales attached to its base on the inside and attaining almost the length of the petal. On the inner side of the petals and at their bases is a horseshoe-shaped disk. Inserted within the disk are 8 stamens. Sometimes shorter, at other times longer than the petals. The hairy ovary, situated in the middle of the flower, is mostly 3-lobed and tapers at the apex into a narrow hairless style about $\frac{1}{12}$ in. long. Fruit yellow when ripe, partly divided into 2 or 3 almost globular lobes, seldom reduced to a single lobe, each lobe measuring over ½ in. in diameter and containing a large almost triangular seed about ½ in. broad immersed in an orange-red pulp which is sharply but pleasantly acid to the taste. Flowering period : September ; fruit ripe in November.

Distribution.—Common in the scrubs of Southern Queensland as far west as the Bunya Mountains and as far north as Proserpine (between Mackay and Townsville). N. S. Wales coastal scrubs from Illawarra (Bentham) to Queensland.

Uses.—The acid fruits have been used for jam-making and for acid drinks. Pigs are fond of them. The timber should be useful for general indoor purposes.

Reference.—*Diploglottis Cunninghamii* Hooker f. in Bentham and Hooker's Genera Plantarum, vol. i., p. 395, 1862–1867.

Diploglottis Campbelli E. Cheel. Tree 60 ft. to 80 ft. high and 2–3 ft. stem diameter (E. Cheel). Leaflets 4–8 to each leaf ; leaflet stalklet up to ⅛ in. ; blade drawn out into a blunt point at apex, base unequal-sided, 2–4½ in. long, 2½–3½ times as long as broad. Capsule 3- or 2-lobed, the lobes measuring, according to E. Cheel, 1½–2 in. across and 1½ in. from top to bottom. Seeds apparently 1 in each lobe, described by E. Cheel as globose or semiglobose, 1–1½ in. diameter, enclosed in a red arillus.—Tweed River.

7. SARCOPTERYX.

Sarcopteryx stipitata Radlk. (*Ratonia stipitata* Benth.). A Corduroy. Up to 40 ft. high and 9 in. stem diameter. Surface of sapwood corrugated. Leaflets 4–6 to each leaf ; leaflet stalklet ⅛–¼ in. ; blade drawn out into acute point at apex, often unequal-sided at base, venation raised and brown beneath, 2–3¾ in. long, 2–3 times as long as broad. Capsule 3- or 4-lobed, ¾ in. long ; seeds 1 in each lobe, egg-shaped, glossy, dark-brown, ⅜ in. long.—Clarence River (Benth.) to Fraser Island.

8. JAGERA.

Jagera pseudorhus Radlk. (*Cupania pseudorhus* A. Rich.). Foambark, Fern Tree. Up to 50 ft. high and 15 in. stem diameter. Bark grey, not very rough ; when cut pale reddish brown, paler inwards, ¼–⅜ in. thick on tree 15 in. stem diameter. In trees examined no indications of the shedding of the bark were found. Branchlets and leaf rhachis densely rusty hairy. Leaflets 12–18 to each leaf ; leaflet stalklet up to $\frac{1}{12}$ in., blade gradually pointed at apex, unequal-sided at base, hairy beneath, margin finely toothed, 1–3¼ in. long, 3–4 times as long as broad. Capsule densely covered with yellowish-brown rigid hairs, egg-shaped and somewhat 3-lobed, 3-celled, up to ¾ in. long ; seeds 1 in each lobe, black or dark brown, egg-shaped, ⅕ in. long, enclosed at base in arillus.—Hastings River (Benth.) to Bloomfield River, North Queensland.

The Distribution of Saponin in Jagera pseudorhus.—The writer* investigated by microchemical methods the location of saponin in this species. The following is a summary of the results :—Saponin was found to be located in the following parts of the tree :—Many of the cells of the cortex of the stem, branchlets, and secondary roots ; some of the cells of the sclerenchyma sheath of the stem, branchlets, and secondary roots ; all of the cells of the sclerenchyma sheath of the young twigs ; many of the bast fibres and parenchyma cells of the outer part of the phloem of the stem, branchlets, and secondary roots ; all of the cells of the xylem groups of the young twigs ; the very young wood fibres of the secondary roots ; many of the cells of the sclerenchyma groups in the walls of the fruit ; and many of the spiral vessels of the vascular bundles in the walls of the fruit. Faint reactions for saponin were shown by the various tissue elements of the very young wood of the branchlets. The greatest concentration of saponin was found in the cell-walls of the various tissues. Almost the whole of the chlorophyllous tissue of the leaflets gave negative reactions with the testing reagent (concentrated sulphuric acid and absolute alcohol in equal parts by volume). A saponin-like substance was located in the cell-walls of the xylem of the vascular bundles in the midrib of the leaflets, and in the cells surrounding the sclerenchyma sheath of the midrib of the leaflets. This saponin-like substance was sometimes present also in the cells of the sclerenchyma sheath of the midrib. It differed from saponin found in the other parts in being less soluble in water. The concentration of saponin in the cell-walls suggests that it is concerned with the construction or composition of the cell-walls. The frequent occurrence of saponin in association with sclerenchyma and xylem suggests that it may be especially connected with the elaboration of lignified and hardened tissue.

Explanation of Figs. 146 *and* 147. The photomicrographs illustrate the structure of some of the tissues examined.

Fig. 146, photomicrograph 1. Transverse section of outer part of bark of branchlet 9 mm. in diameter. The outer surface is shown in the uppermost part of the picture. Inwards from the surface the dark band of small cells traversed from left to right by a lighter portion is the periderm. Inwards from the periderm is the comparatively large-celled cortex. In the cortex slightly towards the left is a group of sclerenchyma. Inwards from the cortex is the sclerenchyma ring which is composed of irregular groups of cells with ill-defined or small lumina (cavities). The sclerenchyma with very small cells in the upper part of the sheath consists of thickened bast fibres in section. The sclerenchyma extends in irregular masses towards the lowermost part of the picture and is shown as pale in the photograph. The comparatively large, clear apertures in the lower half represent the sieve-tubes in section. The dark, thick-walled cells between the sieve-tubes are bast fibres. × 100.

Photomicrograph 2. Radial section through outermost part of bark of branchlet 9 mm. in diameter. On extreme right the surface of the bark is shown. Inwards from it is the periderm consisting of two series of small cells arranged in horizontal rows. Inwards from the periderm is the cortex consisting of large cells. The cortex is bounded on the left by the perpendicular band constituting the sclerenchyma ring, which is composed of highly lignified bast fibres and, on the upper left side, of stone cells. Some unlignified parenchyma is shown on the lower left side of the sclerenchyma ring. × 170.

Fig. 147, photomicrograph 3. Part of the same section the outermost portion of which is shown in Fig. 2. The outer part of the phloem is shown in this picture. The large, open, vessel-like elements passing from top to bottom of picture are sieve-tubes. The sieve-fields on the lateral walls of the sieve-tubes are indistinctly seen in places. Some bast fibres are shown between the sieve-tubes on the right half of the picture. They are traversed in places by septa and accompanied by parenchyma which is shown towards the top and bottom. On the extreme left elongated parenchyma is shown. × 170.

Photomicrograph 4. Transverse section of secondary root 5 mm. in diameter showing outer portion. The broad, dark band in the upper part indicates the position of the periderm. Below it the cortex, consisting principally of very large cells, is shown. Below the cortex the irregular band of tissue composed of cells with ill-defined boundaries is the sclerenchyma ring. In the middle of the picture the sclerenchyma ring is seen projecting inwards and flanking two large sieve-tubes. Below the sclerenchyma ring the dark-celled tissue is the phloem in which the large apertures represent sieve-tubes in section. The lowermost portion of the picture shows the wood. × 100.

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* Francis, W. D. The Location of Saponin in the Foam-bark tree (*Jagera pseudorhus*). Proc. Roy. Soc. Q'land 40, 51–61, 1929.

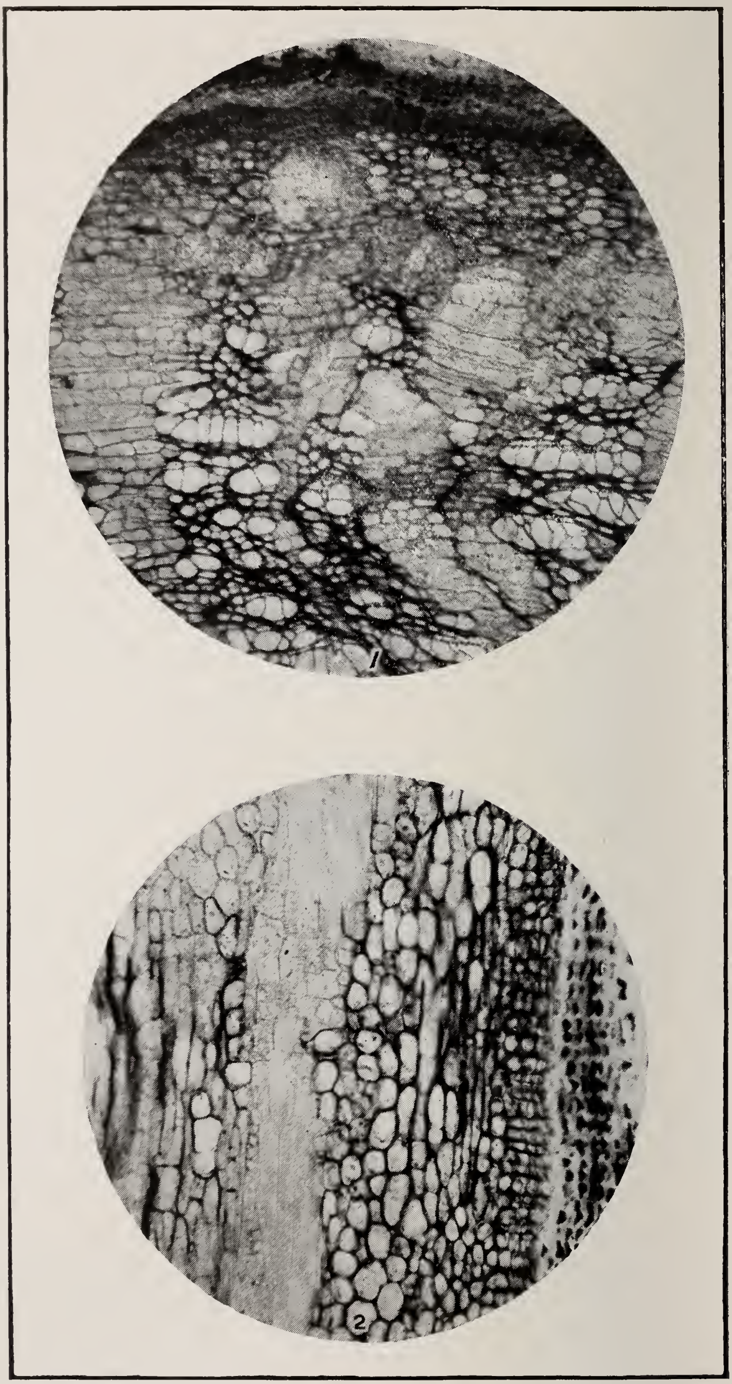


Fig. 146.—(1) Transverse section of outer part of bark of branchlet of *Jagera pseudorhus*, × 100. (2) Radial section of outer part of bark of branchlet of *Jagera pseudorhus*, × 170. Explanation in text.

(*Photomicrographs: W. D. F.*)

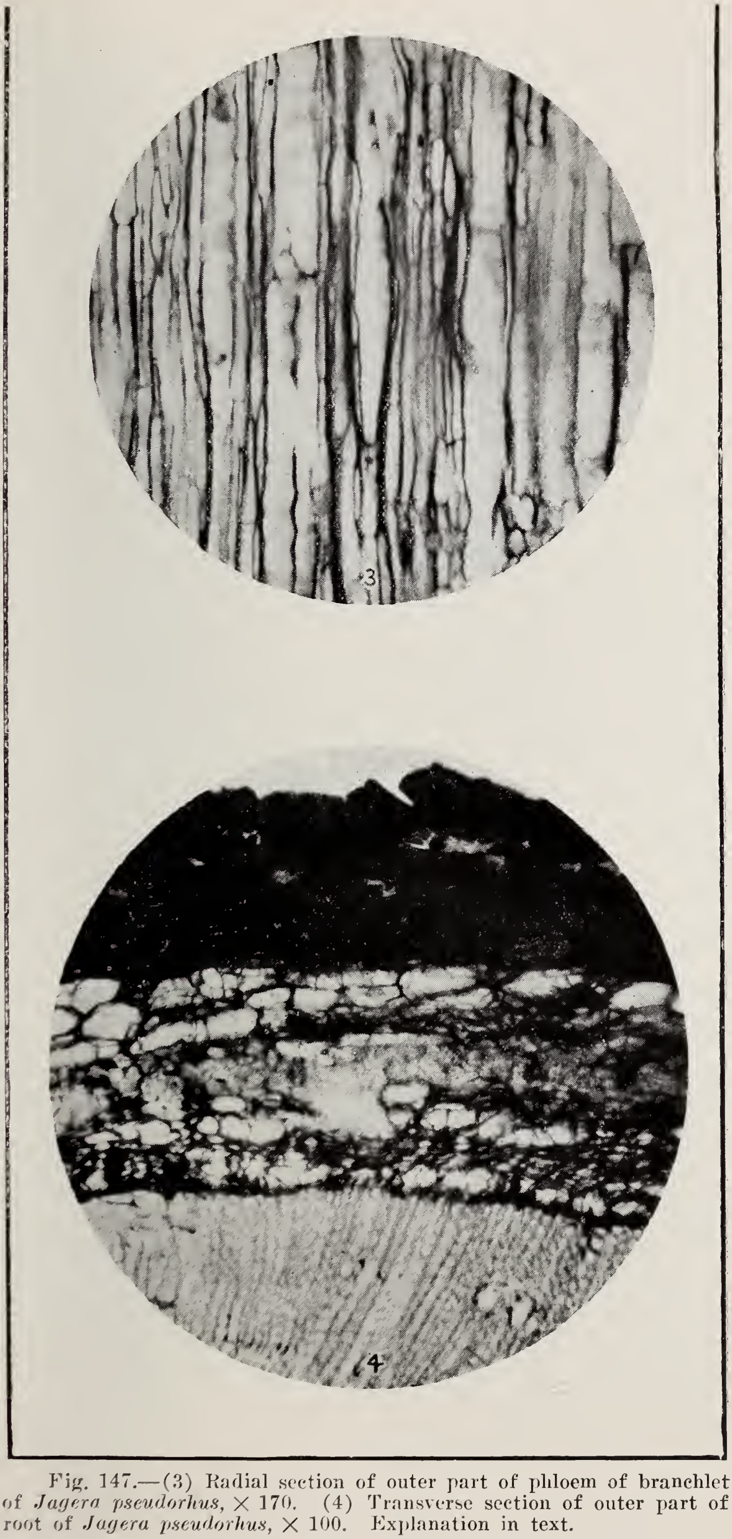


Fig. 147.—(3) Radial section of outer part of phloem of branchlet of *Jagera pseudorhus*, × 170. (4) Transverse section of outer part of root of *Jagera pseudorhus*, × 100. Explanation in text.

(Photomicrographs: W. D. F.)

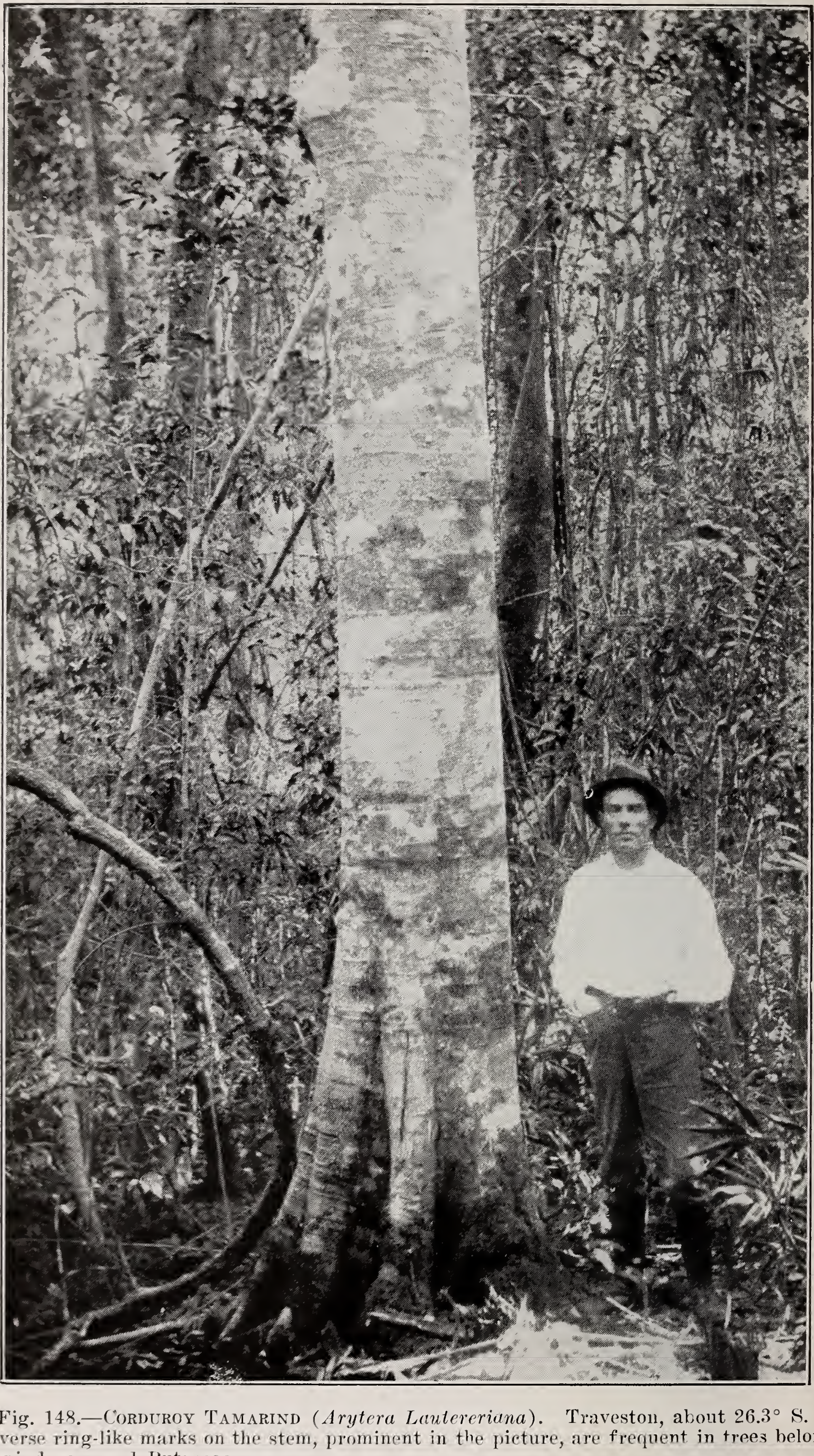


Fig. 148.—Corduroy Tamarind (*Arytera Lautereriana*). Traveston, about 26.3° S. Th transverse ring-like marks on the stem, prominent in the picture, are frequent in trees belongin to Sapindaceae and Rutaceae.

(*Photo.: W. D. F.*)

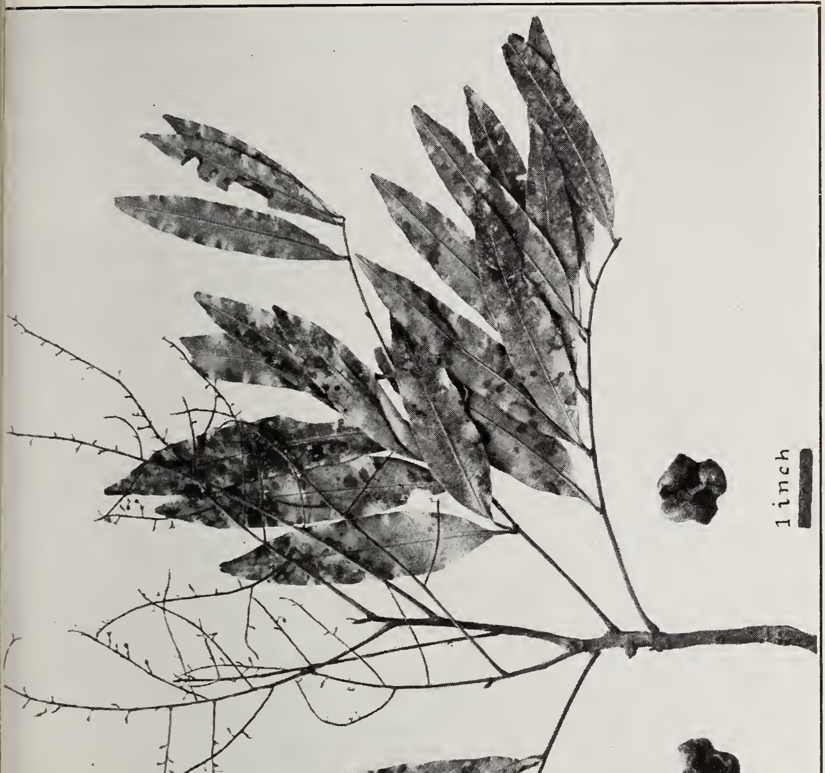


Fig. 149.—CORDUROY TAMARIND (*Arytera Lautereriana*). Inflorescence-bearing branchlet. Detached fruit in lower part. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

9. TOECHIMA.

Toechima tenax Radlk. (*Ratonia tenax* Benth.). Small tree. Leaflets 2–6 to each leaf ; leaflet stalklet indistinct or up to 1/12 in. ; blade bluntly pointed at apex, gradually narrowed towards base, margins often wavy but not toothed, 1½–2¾ in. long, 2½–3 times as long as broad. Capsule pear-shaped, angular, ⅝–¾ in. long, 2- or 3-lobed, 2- or 3-celled. hairy inside ; seeds 1 in each cell, egg-shaped, glossy, almost black, ¼ in. long.—Northern N. S. Wales (Moore) to Gympie.

Toechima dasyrrhache Radlk. Described by Radlkofer as a shrub or small tree 8–15 ft. high. Leaflets 6–8 to each leaf ; leaflet stalklet ⅛–¼ in., swollen ; blade 2–3 in. long, 2½ times as long as broad, drawn out into a short blunt point at apex, base often unequal-sided, venation prominent beneath. Fruit unknown.—Tweed River.

10. ELLATOSTACHYS.

Ellatostachys xylocarpa Radlk. (*Cupania xylocarpa* A. Cunn.). Small tree. Young shoots and branchlets sometimes rusty-hairy. Leaflets 4–6 (sometimes 2–3) to each leaf ; leaflet stalklet 1/12–⅛ in. ; blade egg-shaped or lance-shaped in outline, margins mostly toothed, underside often hairy and with tufts of hairs or thickenings where the lateral nerves join the midrib, venation prominent beneath, 2–4 in. long, 2–3 times as long as broad. Fruit globose or slightly pear-shaped, up to ¾ in. long, very hard and woody, hairy on inside, mostly 3-celled : seeds 1 in each cell, glossy, dark brown, elongate egg-shaped, ¼–⅜ in. long, enclosed in pale arillus at base.—Clarence River (Benth.) to Rockhampton.

Ellatostachys nervosa Radlk. (*Cupania nervosa* F.v.M.). Up to 50 ft. high and 1 ft. stem diameter. Leaflets 3–6 to each leaf ; leaflet stalklet ⅛–⅜ in. ; blade often sickle-shaped, margins sometimes toothed, venation fairly prominent, 3½–5½ in. long, 3–4 times as long as broad. Fruit hard and woody, globose or slightly 3-lobed, 3-celled, ½–¾ in. diameter, hairy on inside ; seeds 1 in each cell, egg-shaped or globose, glossy, dark brown, ¼ in. long, arillus very small.—Clarence River (Benth.) to Proserpine.

11. ARYTERA.

Arytera divaricata F.v.M. (*Nephelium divaricatum* F.v.M.). Small tree. Leaflets 2–7 to each leaf ; leaflet stalklet ⅛–¼ in. long ; blade with prominent venation beneath, 2½–5 in. long, 2–3 times as long as broad. Fruit consisting of 1–3 almost distinct egg-shaped or oval lobes ½–¾ in. long, almost smooth outside, hairy inside ; seeds 1 in each lobe, oval, brown, up to ⅝ in. long, the arillus enclosing the greater part of seed.—Port Macquarie (Maiden) to Proserpine.

Arytera foveolata Radlk. (*Nephelium foveolatum* F.v.M.). Small tree. Leaflets 3–6 to each leaf. Leaflet stalklet ⅛–¼ in. ; blade with entire or sometimes slightly toothed margins, venation prominent on underside where the lateral nerves form small thickenings or hollow glands (foveolae) where they join the midrib, 2¼–5 in. long, 2–3 times as long as broad. Fruit consisting of 1–3 almost distinct, egg-shaped or oval lobes, about ½ in. long, finely hairy outside ; seeds 1 in each lobe, egg-shaped, ⅜ in. long, completely covered by arillus.—Richmond River (Maid. and Betche) to Gympie.

Arytera distylis Radlk. (*Nephelium distyle* F.v.M., *Ratonia distylis* F.v.M.). Small tree. Leaflets mostly 2, sometimes 1, 3, or 4 to each leaf ; leaflet stalklet indistinct or up to ⅕ in. ; blade 2¼–4½ in. long, 2½–3 times as long as broad. Fruit consisting of 2 (sometimes 3 or 1) almost distinct egg-shaped or oval lobes ⅜–½ in. long ; seeds 1 in each lobe, up to ⅜ in. long, partly covered by arillus.—Richmond River (Maiden) to Bowen (Benth.).

Arytera Lautereriana Radlk. Corduroy Tamarind (on account of the peculiar wrinkled surface of the sapwood resembling corduroy cloth and the acid pulp of the fruit resembling the Tamarind in flavour), Rose Tamarind. Figs. 148, 149, 5, 7.

Derivation.—Arytera from Greek *aryter*, a cup (in allusion to the concave valves of the fruit) ; Lautereriana, after Dr. J. Lauterer.

Description.—A tree attaining a height of about 80 ft. and a stem diameter of 1 ft. 8 in. Stem slightly flanged at the base in the larger trees. Bark grey, fairly smooth ; when cut, reddish brown, measuring almost ½ in. thick on a tree with a stem diameter of 1 ft. 8 in. Surface of sapwood strongly wrinkled longitudinally. Young shoots hairless or nearly so. Leaves alternate, pinnate, consisting of about 8–16 leaflets. Each leaflet has the appearance of an ordinary leaf, is borne on a short stalklet from ⅛–¼ in. long, is narrowly elliptical in shape, bluntly pointed at the apex, wavy on the margins, with the midrib and numerous nearly transverse lateral nerves visible on both surfaces ; measurement of leaflets, 2½–5 in. long, 5–6 times as long as broad.

Flowers in slenderly branched inflorescences (panicles) borne near the ends of branchlets. Flowers scarcely ⅛ in. in diameter. The outer part of the flower, the calyx, is cup-shaped, about 1/12 in. in diameter, and divided for about half its length into 5 roundish lobes. On the inner side of the calyx lobes and alternating with them are the 5 petals, which have a broad and minutely toothed apex and are hairy on the inside; the petals including the claw or stalklet measure about 1/12 in. long. On the inner side of the petals are 8 bristle-like, minutely hairy stamens about 1/12 in. long. The ovary, in the centre of the flower, is round or egg-shaped and tapers into a narrow or short style which is minutely 3-lobed at the apex. The fruit is 3-lobed or occasionally 1- or 2-lobed and often measures 1 in. in diameter. In each lobe of the fruit there is an angular seed 3 or 4 lines broad embedded in a fleshy amber-coloured substance (the arillus), which has a sharply acid flavour like the pulp of the Tamarind. Flowering period: May–June; fruiting period, about November.

Distribution.—Confined to Queensland; scrubs of the North Coast line, from Beerwah to Maryborough; Fraser Id. More recently the species has been found on the Eungella Range, 45 miles west from Mackay.

Uses.—Some economic use may be made of the acid pulp of the fruits. The timber could be used for indoor fittings and cabinet-work. The tree is a very handsome one on account of its dense green and elegant foliage; and is well worthy of cultivation as an ornamental species.

References.—*Arytera Lautereriana* L. Radlkofer in letter; *Nephelium Lautererianum* F. M. Bailey, Botany Bulletin No. 4, p. 8, 1891 (Bulletin No. 13, Dept. Agriculture and Stock, Brisbane).

12. MISCHOCARPUS.

Mischocarpus pyriformis Radlk. (*Ratonia pyriformis* Benth.). Small tree. Leaflets 4–8 to each leaf. Leaflet stalklet ⅜–⅝ in.; blade 4–7 in. long, 2–3 times as long as broad, minute net-veins visible on both sides, texture firm. Fruit pear-shaped, stalklet (stipes) about ¼ in.; upper portion of fruit ⅜–½ in. in diameter, containing 1 or 2 egg-shaped or partly flattened seeds ¼–⅜ in. long, each seed enclosed in arillus.—Bellinger River to Atherton Tableland.

Mischocarpus anodontus Radlk. (*Ratonia anodonta* Benth.). Small tree (?). Leaflets 2, sometimes 3, or rarely 4 to each leaf. Leaflet stalklet ¼–½ in.; blade 2½–5 in. long, 2–2⅓ times as long as broad, minute net-veins visible on both sides. Fruit pear-shaped, stalklet (stipes) ⅜–½ in.; upper portion of fruit ½–⅝ in. in diameter, very hairy inside, enclosing 1 or 2 seeds; seeds, when only 1, egg-shaped, ½ in. long, enclosed in arillus except on one side of apex.—Richmond River (Maid. and Betche) to Proserpine.

13. HARPULLIA.

Harpullia alata F.v.M. Described as a tall tree. Flowering and fruiting as shrub. Leaflets 6–10 to each leaf, the axis to which the leaflets are attached spread out or winged to ½ in. breadth. Leaflet stalklet scarcely distinct; blade with prominent venation especially beneath, margins toothed, prickly-toothed or irregular, apex pointed, 3–6 in. long, 2–4 times as long as broad. Capsule 2-lobed, clothed with brownish minute star-shaped hairs, 1–1½ in. broad; seeds 2 or 1 in each lobe, enveloped in arillus.—Clarence River (Benth.) to Macpherson Range.

Harpullia Hillii F.v.M. Described as a tree of 60–80 ft. Leaflets 6–11 to each leaf. Leaflet stalklet up to ⅕ in.; blade firm or rigid, blunt or rounded at apex, venation prominent on both sides, 2½–5½ in. long, 2–3 times as long as broad. Capsule 2-lobed, 1½ in. broad, clothed outside with yellowish hairs, hairy inside; seeds described as 1 or 2 in each lobe, egg-shaped, ⅓–½ in. long.—Clarence River (Benth.) to Ayr.

Harpullia pendula Planch. Tulipwood, Tulip Lancewood. Figs. 150 and 151.

Derivation.—Harpullia from Harpulli, the vernacular name in India of *Harpullia cupanioides*, the first-named species of the genus; *pendula*, Latin, hanging or drooping.

Description.—A tree attaining a height of about 80 ft. and a stem diameter of about 2 ft. Stem sometimes flanged at the base in the larger trees; often irregular and grooved or angular in cross section. Bark grey, shed in round or irregular long flakes; when cut, dull yellow or cream-coloured, measuring ¼ in. thick on a tree with a stem diameter of 1 ft. 8 in. Sapwood pale or yellowish, mostly abundant and thick; heartwood dark brown or streaked with dark brown. Young shoots and parts of the flowers finely downy. Leaves alternate, pinnate, consisting of 3–8 leaflets. Each leaflet is borne on a stalklet ⅛–⅕ in. long, is elliptical or narrowly elliptical in outline, is drawn out into a blunt point at the apex; the midrib, lateral nerves, and net-veins

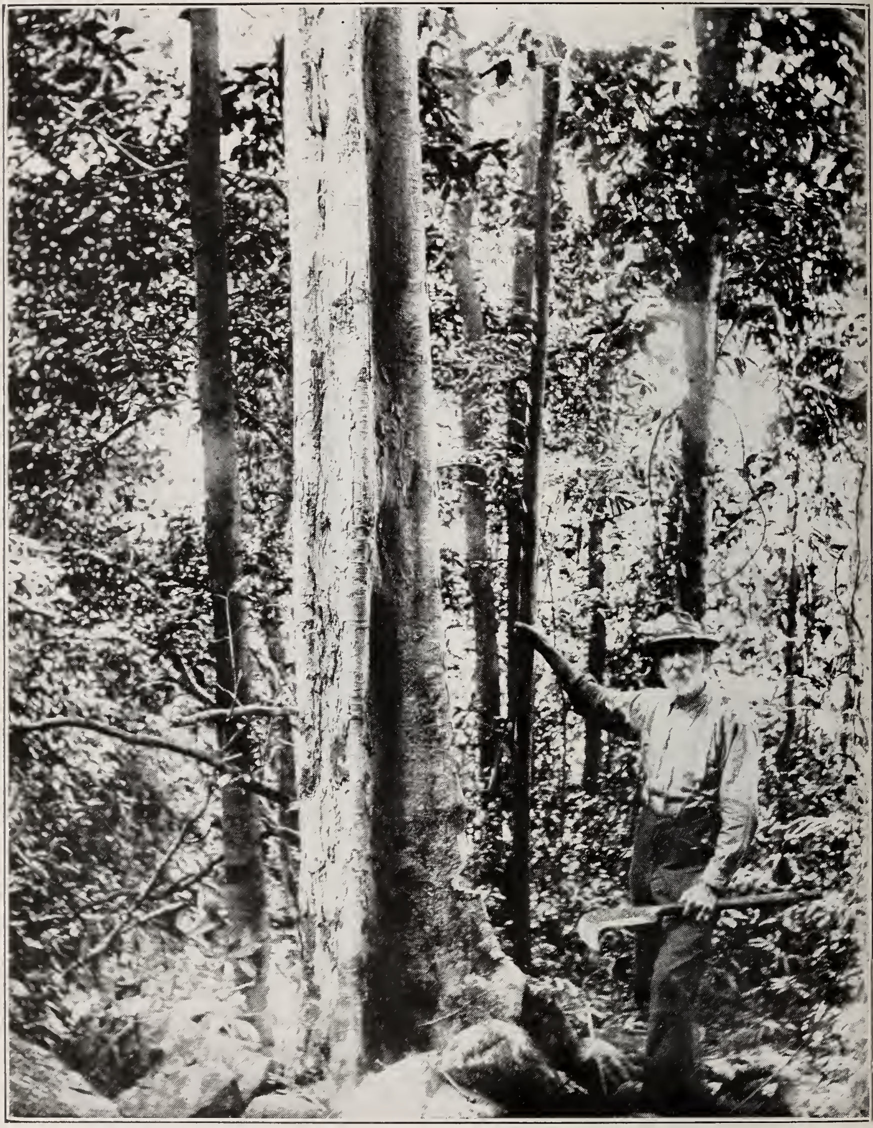
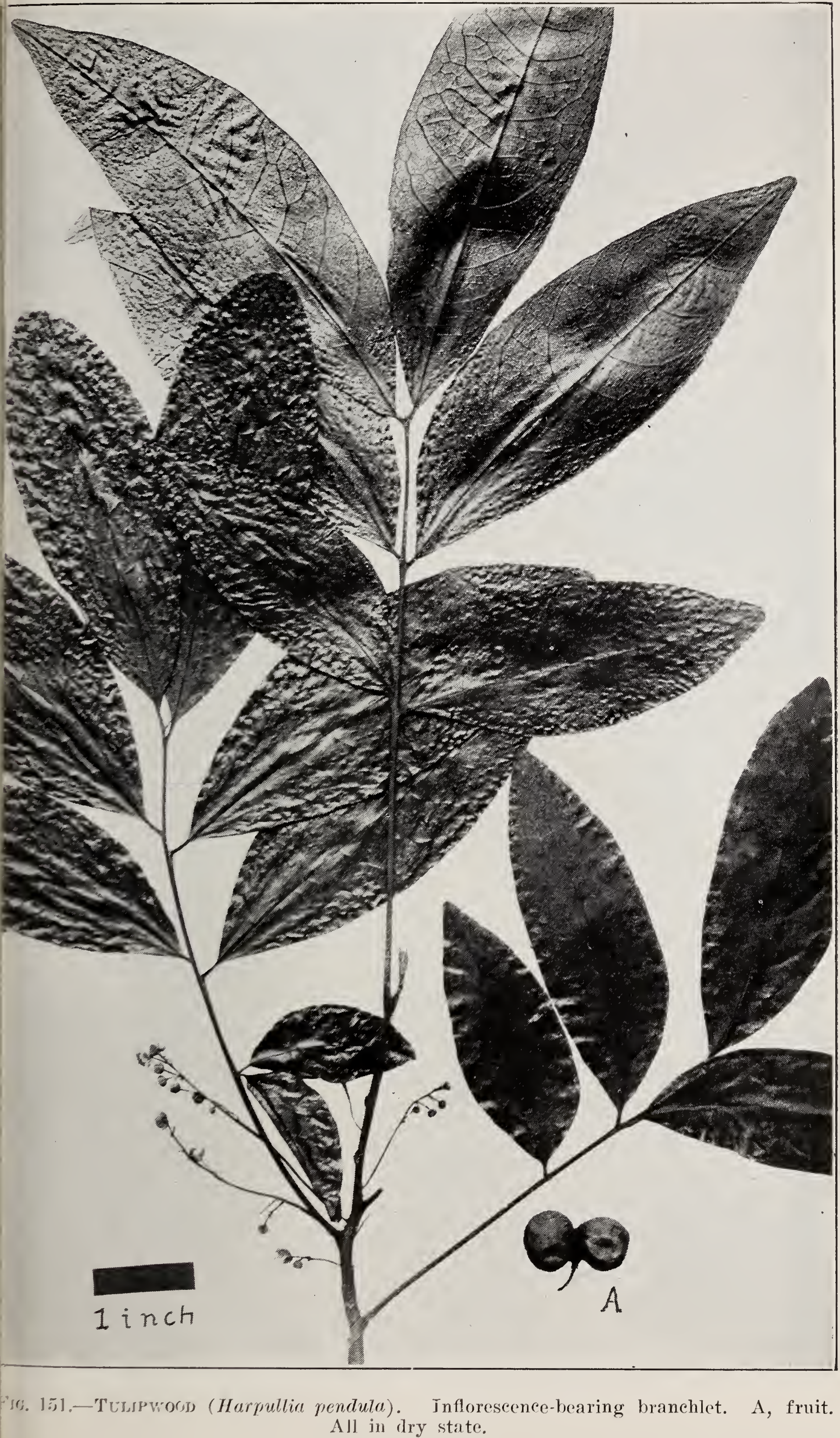


Fig. 150.—Tulipwood (*Harpullia pendula*). Kin Kin, about 26.2° S. The depressio left by discarded flakes of bark are shown. In the basal portion large rocks on the so surface are evident.

(*Photo.: W. D. F.*)



IG. 151.—TULIPWOOD (*Harpullia pendula*). Inflorescence-bearing branchlet. A, fruit. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

visible on the upper surface, but more conspicuous on the underside; measurement of leaflet blade, 2–5 in. long, 2–4 times as long as broad. Flowers in rather narrow inflorescences (panicles) situated in the forks of the leaves or above or below them, the panicles sometimes as long as the leaves. Stalklets of the flowers about $\frac{1}{4}$ in. or more in length. Individual flowers greenish yellow, measuring about $\frac{5}{8}$ in. in diameter when expanded: the outer part, the calyx, consisting of 5 oval or circular downy lobes measuring about $\frac{1}{5}$ in. in length. On the inner side of the calyx are 5 oval petals inserted on a small stalk or claw and wrinkled or eared just above the claw; they are finely hairy especially on the inner side towards the base, and each one measures about $\frac{1}{4}$ in. long. On the inner side of the petals are 5–8 stamens about $\frac{1}{8}$ in. long. The ovary, situated in the centre of the flower, is downy, 2-lobed, and surmounted by a spirally twisted style about $\frac{1}{4}$ in. long. The fruit is yellow or reddish and is deeply divided into 2 round lobes each measuring $\frac{1}{2}$–$\frac{3}{4}$ in. in diameter and each containing 1 or 2 shining dark-brown or black oval seeds measuring about $\frac{1}{2}$ in. in length and attached near the top of the central axis of the fruit. Flowering period: Both flowers and fruit were found on the trees in March and April; flowers also in November.

Distribution.—Coastal scrubs from the Bellinger River, N.S.W. (J. H. Maiden), to the Mulgrave River, near Cairns, North Queensland.

Uses.—The timber with its strongly contrasted light and dark patches is valuable for cabinet-making, although it is not very plentiful. The tree is frequently cultivated in parks, gardens, and on road-sides as an ornamental species. The wood is remarkable for its heaviness and banded or streaked dark-brown colouration relieved by pale or yellowish areas. It is very finely grained.

Reference.—Harpullia pendula Planchon in F. v. Mueller's paper in Transactions of Victorian Institute, vol. iii., p. 26, 1859.

Family AKANIACEAE.

Akania Hillii Hook. f. Turnipwood. Up to 40 ft. high and 9 in. stem diameter. Bark and young wood have odour of turnips. Leaves alternate, pinnate, consisting of 12–30 long, rigid, prickly-toothed, strongly veined leaflets. Leaflet stalklet $\frac{1}{4}$–$\frac{1}{2}$ in. long; blade 4–10 in. long, $3\frac{1}{2}$–7 times as long as broad. Capsule $\frac{3}{4}$–1 in. long, mostly 3-celled, each cell containing 2 or 1 seed; seeds globose or egg-shaped, about $\frac{3}{8}$ in. in diameter.—Camden Haven (Maiden) to Palmwoods.

Family RHAMNACEAE.

Leaves green on underside. Ovary seated on disk but not immersed in it .. .. 1. *Emmenosperma.*
Leaves white or pale on underside. Ovary immersed in the disk 2. *Alphitonia.*

1. EMMENOSPERMA.

Emmenosperma alphitonioides F.v.M. Yellow Ash, Bonewood. Figs. 152 and 153.

Derivation.—Emmenospermum from Greek *emmeno*, I abide in or I cleave to; *sperma*, a seed (in allusion to the way the seeds often remain in position on the axis of the fruit after the fruit valves have fallen away); alphitonioides from Alphitonia, an allied genus; Greek *eidos*, resemblance.

Description.—A tree attaining a height of about 120 ft. and a stem diameter of about 2 ft. Stem not flanged at the base in South Queensland specimens. Bark grey, slightly wrinkled; when cut, bright yellow or yellowish brown, measuring $\frac{3}{8}$ in. thick on a tree with a stem diameter of 18 in. Sapwood white. Branchlets mostly green and smooth. Leaf-stalks $\frac{1}{4}$–$\frac{1}{2}$ in. long. Leaves opposite, egg-shaped or elliptical in outline, sometimes narrowed at the apex into a blunt point; upper surface glossy, the midrib and lateral nerves alone visible; under surface slightly paler with the net-veins visible; leaf measurement $1\frac{3}{4}$–3 in. long (up to 4 in. in Northern specimens), 2–$2\frac{3}{4}$ times as long as broad. Flowers in small inflorescences (panicles) at the ends of branchlets or in the forks of the upper leaves, the panicles mostly shorter than the leaves. Individual flowers on distinct stalks. The flowers measure about $\frac{3}{16}$ in. in diameter; the calyx, which is the outermost and largest part, consists of a bell-shaped cup with 5 small triangular lobes at the rim. Each of the 5 petals is inserted between the calyx lobes, is minute, white, and hood-shaped, and encloses a minute anther on a short stalklet. Ovary (in the centre of the flower) egg-shaped, tapering at the apex into 2 or 3 small stigmas. Fruit nearly globular, about $\frac{3}{8}$ in. in diameter, mostly 2-celled with 1 seed in each cell; it is remarkable for the fact that the outer part of the fruit mostly falls away and leaves the seeds attached to the top of the fruit-stalk. Seeds round or oval but flattened vertically, smooth, shining, bright red or occasionally brown, attaining nearly $\frac{1}{4}$ in. in length. Flowering period: September–October, March. In fruit, October.

Distribution.—Coastal scrubs from Illawarra, N.S.W. (Bentham), to Barron River, North Queensland.

Uses.—J. H. Maiden (Forest Flora N.S.W., 8, p. 59) states that the wood is suitable for staves, oars, wheelwright's work, tool handles, and boat-building.

Reference.—*Emmenosperma alphitonioides* F.v.M., Fragmenta Phytographiae Australiae, vol. iii., p. 63, 1862–1863.

2. ALPHITONIA.

Alphitonia Petriei Braid. & White. Red Ash, White Ash, White-leaf, Red Almond. Figs. 154 and 155.

Derivation.—Alphitonia from Greek *alphiton*, pearl barley (allusion obscure); Petriei, after W. R. Petrie.

Description.—A tree attaining a height of 140 ft. and a stem diameter of 2 ft. Bark dark grey, dark brown, or nearly black; on the larger trees deeply fissured somewhat like that of the Forest Ironbark; when cut, reddish brown in colour and measuring nearly 1 in. thick on a tree with a stem diameter of 2 ft. Sapwood white. Young shoots, young branchlets, branches of the inflorescence, and underside of leaves minutely downy. Leaf-stalks $\frac{3}{8}$–$\frac{5}{8}$ in. long. Leaves alternate, varying in outline from egg-shaped to narrowly elliptical, rounded or somewhat tapering at each end, upper surface smooth and glossy, underside white or pale with minute densely interwoven hairs, midrib and lateral nerves visible on upper side; midrib, lateral nerves, and net-veins conspicuous on the underside; measurement of leaf-blade, 3–6 in. long, 2–5 times as long as broad. Flowers in inflorescences (cymose panicles) in the forks of the leaves or at the ends of branchlets, the inflorescences generally shorter than the leaves. Individual flowers cream-coloured, fragrant, about $\frac{1}{5}$ in. in diameter when expanded. The outermost part of the flower, the calyx, has 5 small triangular lobes $\frac{1}{16}$ in. long. Alternating with the calyx lobes are 5 small, narrow, hood-shaped petals less than $\frac{1}{16}$ in. long, each petal enclosing a small stamen as long as the petal. In the middle of the flower and surrounding the ovary is the flat disk, which measures nearly $\frac{1}{12}$ in. in diameter and is obscurely 5-sided. The ovary is minute and tapers into a style with 3 or 2 small lobes. Fruit round, nearly black, about $\frac{1}{2}$ in. in diameter, surrounded below the middle by the ring-like scar of the calyx rim, containing 3 (or 2) hard cells, each cell containing a glossy, reddish-brown, nearly oval seed measuring about $\frac{1}{6}$ in. long. Flowering period: October.

Distribution.—Common in Queensland from the Blackall Range in the south to Cairns in the north. North Australia from Thursday Id. to Port Darwin.

Properties.—The bark of the young branches has a peculiar sarsaparilla-like scent. The leaves and young shoots are eaten by stock and are considered to be good forage. The timber is red in colour and should be useful for cabinet-making, lining, and for general indoor fittings.

Note.—The species is very closely allied to the more widely distributed *Alphitonia excelsa* Reissek. Braid and White, in describing *Alphitonia Petriei* as a new species, remark: "*A. excelsa* is a native of the open (Eucalyptus) forest, the drier inland and coastal scrubs of New South Wales and New South Wales–Queensland border. *A. Petriei* is a native of tropical and subtropical rain forests of coastal Queensland from about 17–27° S." *A. excelsa* flowers in March whereas *A. Petriei* flowers in October.

Reference.—*Alphitonia Petriei* K. W. Braid and C. T. White in Kew Bulletin No. 4, p. 178, 1925.

Family ELAEOCARPACEAE.

Fruit succulent and indehiscent, the internal hard part often with a wrinkled surface	1. *Elaeocarpus.*
Fruit capsular, hard and dry, covered with rigid bristles and opening in 2–4 valves	2. *Sloanea.*

1. ELAEOCARPUS.

Elaeocarpus holopetalus F.v.M. Described by Mueller as a tree of 80 ft., with viscid young branchlets; leaves 2–6 in. long, margins toothed, velvety hairy below: hard part (putamen) of fruit almost egg-shaped, $\frac{1}{4}$–$\frac{5}{12}$ in. long, 2-celled, 1 cell bearing a seed.—Valleys of Nungatta Mountains, Gippsland, and Terra River between Genoa and Snowy River (F.v.M.).

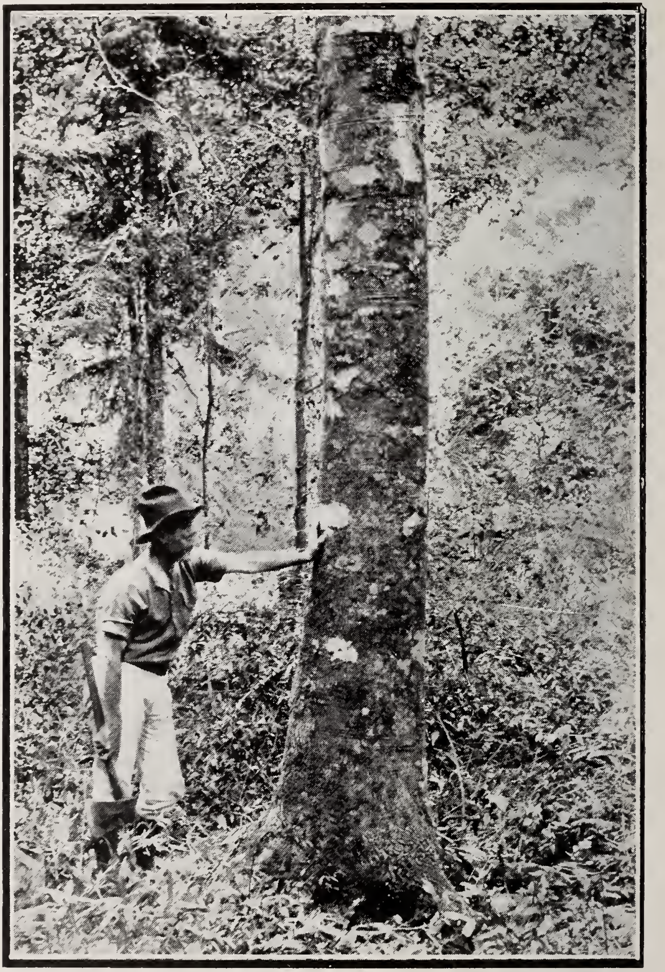


Fig. 152.—Yellow Ash (*Emmenosperma alphitonioides*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

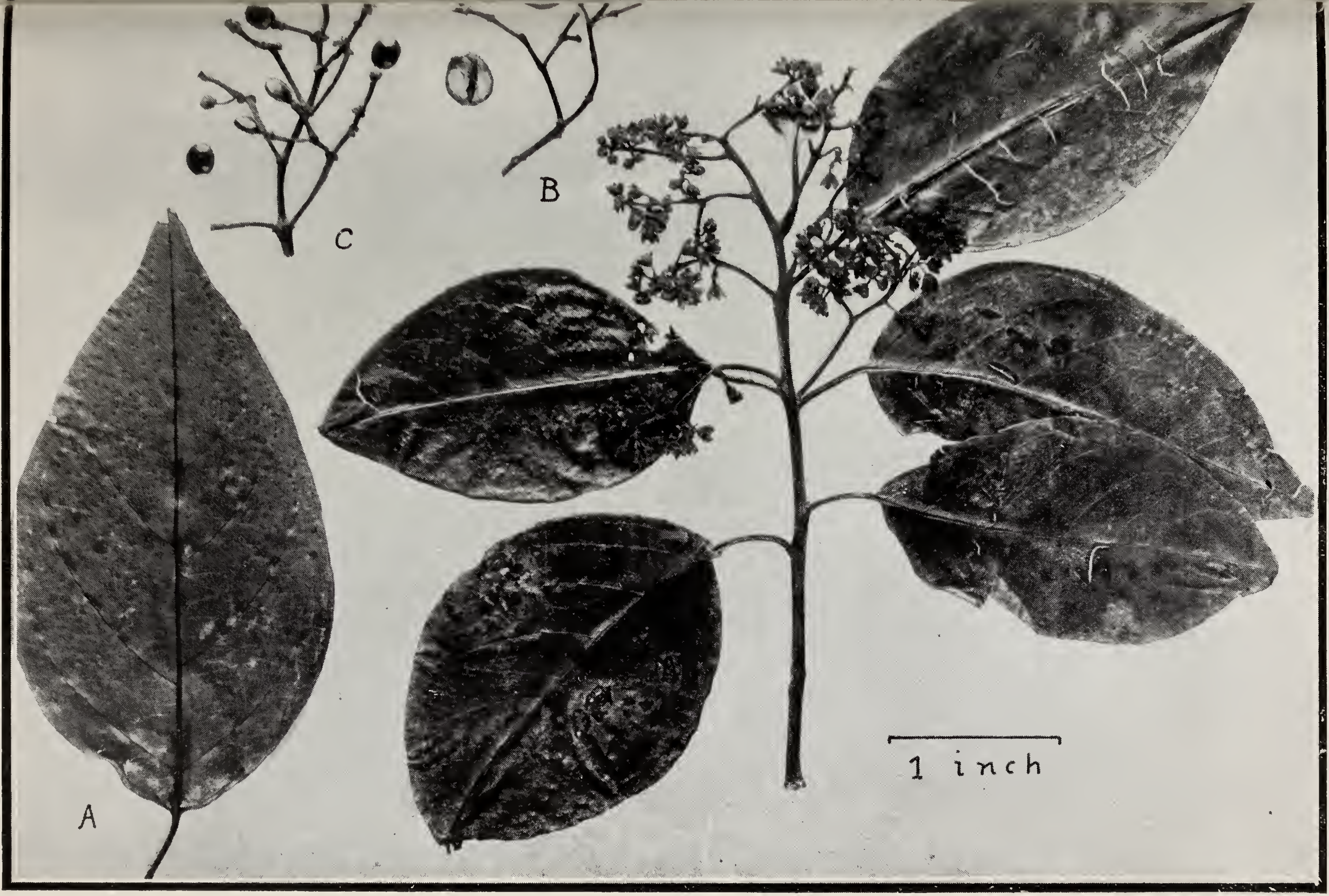


Fig. 153.—Yellow Ash (*Emmenosperma alphitonioides*). A, underside of leaf; B, fruit; C, seeds, some of which remain attached to stalk. Inflorescence-bearing branchlet on right. All in dry state. (*Photo.: Dept. Agric. and Stock, Brisbane.*)

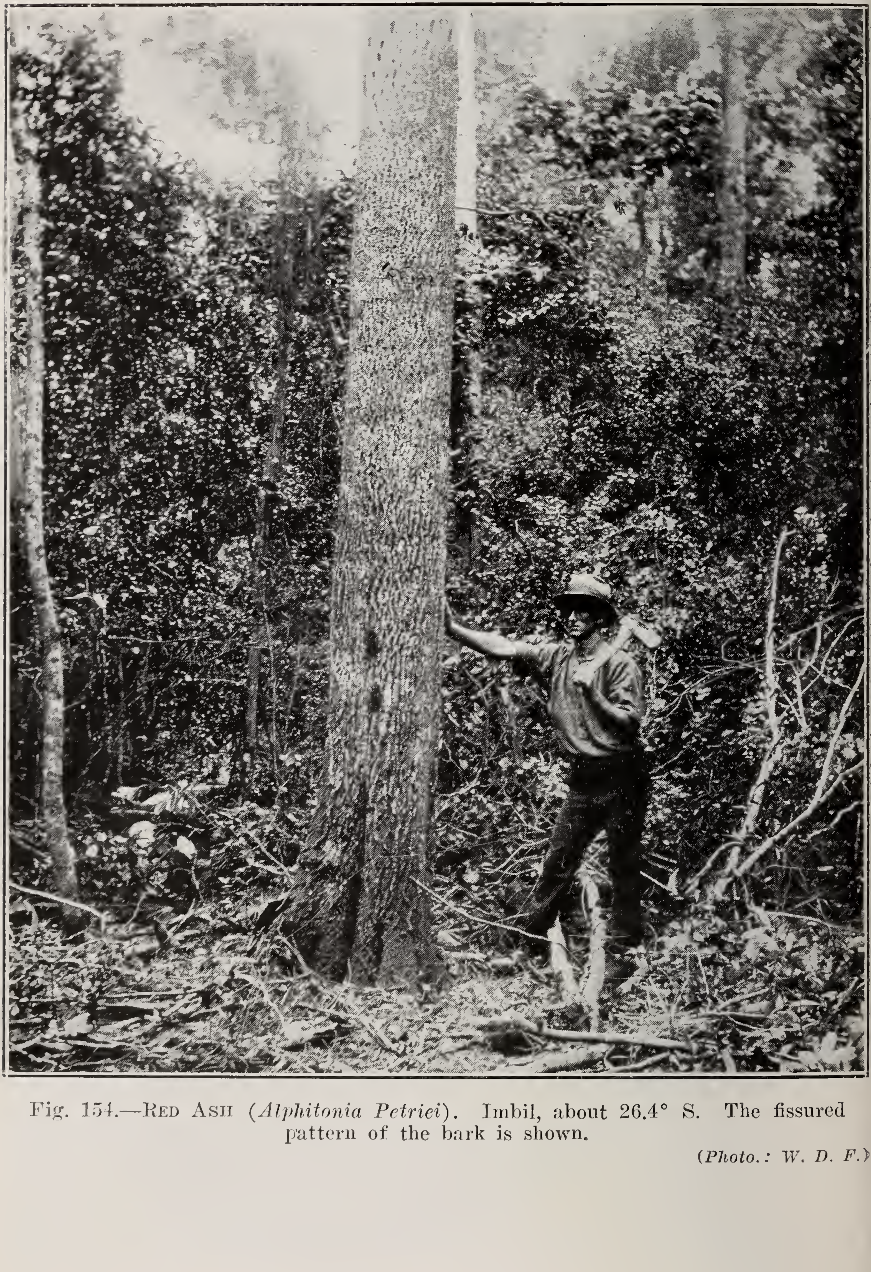


Fig. 154.—Red Ash (*Alphitonia Petriei*). Imbil, about 26.4° S. The fissured pattern of the bark is shown.

(*Photo.: W. D. F.*)

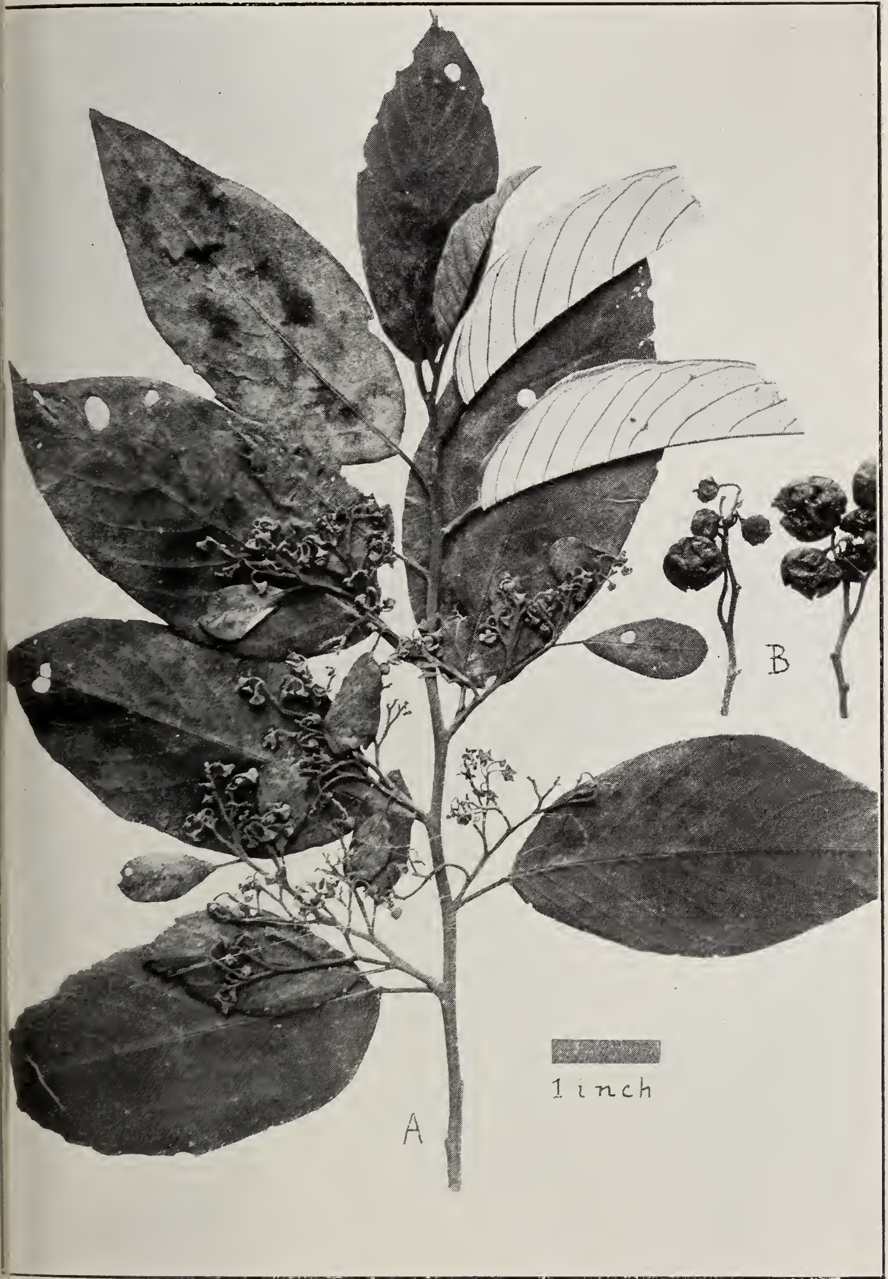


Fig. 155.—Red Ash (*Alphitonia Petriei*). A, inflorescence-bearing branchlet; B, fruit-bearing twigs. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

157. **Elaeocarpus obovatus** G. Don. Blue Berry Ash, Grey Carrobean. Figs. 156 and

Derivation.—Greek *elaia*, the olive tree ; *karpos*, fruit ; obovatus Latin, reversed egg-shaped (in allusion to the shape of the leaf).

Description.—A tree attaining 120 ft. in height and a stem diameter of over 3 ft. Stem often widely buttressed at the base. Bark grey, slightly rough but not scaly ; when cut, brown, yellow towards sapwood, $\frac{3}{4}$ in. thick on a tree with a stem diameter of 3 ft. Surface of sapwood pale yellow ; sapwood white when cut. After several hours exposure, the inner surface of the bark and the surface of the sapwood sometimes turn a greenish black colour. Leaf-stalks $\frac{1}{6}$–$\frac{1}{4}$ in. long. Leaves alternate, elliptical or narrowly elliptical, often broader towards the apex, rounded or with a blunt point at the apex, mostly gradually narrowed into the stalk, margins often toothed, teeth often distant ; leaf-blade measurement 2–3$\frac{1}{2}$ in. in length, 2–3 times as long as broad. Flowers in rather narrow racemes springing from the forks of the leaves or from the scars of fallen leaves, the racemes about as long as the leaves. Stalks of individual flowers $\frac{1}{10}$–$\frac{1}{6}$ in. long. Individual flowers about $\frac{1}{6}$ in. long. The outer part of the flower, the calyx, is composed of 5 pointed lobes about the length of the flower. On the inner side of and between the calyx lobes, and about as long as them, are the 5 petals, each of which is split into 6 or 7 narrow teeth at the apex. On the inner side of the petals and shorter than them are the bristle-like stamens, over 15 in number, surrounding the central small egg-shaped ovary. The stamens in this species are similar in structure to those of *Elaeocarpus grandis* (*see* description), but they measure slightly less than $\frac{1}{10}$ in. in length, are covered by very minute bristles, and the small stalklet at the base (filament) is distinct from the upper part (anther) ; the 2 terminal lobes of the anther between which the pollen is discharged are blunt in this species and not drawn out into hair-like points as in *Elaeocarpus grandis*. The ovary is without hairy covering but the disk at its base, which also carries the stamens, is hairy. Fruit oval or globular, blue, about $\frac{1}{2}$ in. long, outer part almost succulent, surrounding a rough tuberculate "stone" which mostly contains a single seed. Flowering period : September.

Distribution.—Coastal scrubs from Port Jackson N.S.W. (C. Moore), to Mt. Perry, west of Bundaberg, Queensland.

Uses.—The timber should be useful for indoor work such as fittings and cabinet-making. It is light in colour or yellowish, light in weight and finely grained ; pores often in radial rows, up to 6 in row ; soft tissue inconspicuous.

References.—*Elaeocarpus obovatus* G. Don in General History of the Dichlamydeous Plants, vol. i., p. 55 ; Bentham, Flora Australiensis, vol. i., p. 281 ; F. M. Bailey, Queensland Flora, Part I., p. 163.

Elaeocarpus Kirtonii F.v.M. Whitewood, Mowbullan Whitewood, White Beech of Bunya Mountains, White Quandong. Figs. 158 and 159.

Derivation.—Elaeocarpus from Greek *elaia*, the olive tree ; *karpos*, fruit ; Kirtonii, after W. Kirton.

Description.—A large tree attaining a height of over 100 ft. and a stem diameter of 3 ft. Stem buttressed at the base. Bark grey, fairly smooth ; when cut, light brown, yellow near sapwood ; inner surface of bark and surface of sapwood yellow ; measurement of bark $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. Sapwood white or pale yellow. Young shoots, young leaves, and inflorescence downy with silky hairs. Leaf-stalks 1–2 in. long (sometimes as short as $\frac{1}{2}$ in.). Leaves alternate, lance-shaped or elliptical, rounded at the base or in some cases shortly narrowed, drawn out into a long point at the apex, margins toothed ; midrib, lateral nerves, and net-veins very conspicuous on both surfaces ; measurement of leaf-blade, 3$\frac{1}{2}$–6 in. or up to 7 in. long on luxuriant shoots, 3$\frac{3}{4}$–4$\frac{1}{2}$ times as long as broad. Flowers in slender racemes, attaining 5 in. in length, springing from the forks of the leaves or from the scars of fallen leaves. Stalks of individual flowers about $\frac{3}{8}$ in. long, sometimes with a bract about $\frac{3}{8}$ in. long at the base of each. Flowers about $\frac{2}{5}$ in. long ; the outer part, the calyx, consisting of 5 lobes about $\frac{3}{10}$ in. long. On the inner side of the calyx are 5 petals broader than the calyx lobes, measuring about $\frac{2}{5}$ in. long, cut at the summit into numerous narrow teeth, and with a hairy thickening inside towards the base. On the inner side of the petals and shorter than them are the bristle-like stamens, 25 or more in each flower. The pollen is discharged from a short split at the apex of the stamens. The structure of the stamens is similar to that of the stamens of *Elaeocarpus grandis* (*see* description) except that the minute covering of hairs is absent. In the centre of the flower is the ovary, which is egg-shaped and hairless and tapers into a slender style and is surrounded at the base by a lobed disk on which the stamens are supported. Fruit egg-shaped, about $\frac{1}{2}$ in. long, the outer part smooth, and somewhat fleshy, enclosing a hard "stone" containing 1 or 2 seeds. Flowering period : March.

Distribution.—Common in the scrubs of the Bunya Mountains (about 100 miles from the coast), ranges about Killarney, Macpherson Range, National Park, Currumbin. A species identical with this one is found in N. S. Wales where it was known as *Elaeocarpus Bauerlenii* or *Elaeocarpus longifolius* ; it is distributed in the coastal scrubs from Nowra in the south to Tweed River in the north (J. H. Maiden, Forest Flora of N.S.W., vol. 8, p. 82, 1925). The species has recently been found on Eungella Range (west of Mackay).

Uses.—The timber should be suitable for general indoor woodwork and cabinet-making.

References.—*Elaeocarpus Kirtonii* F.v.M. (inedited) in F. M. Bailey's First Supplement to Synopsis of Queensland Flora, p. 8, 1886 ; *Elaeocarpus longifolius* C. Moore and *Elaeocarpus Bauerlenii* Maiden and Baker are synonyms.

Elaeocarpus eumundi F. M. Bailey. Described by Bailey as a tree of considerable size. Leaves alternate ; stalks ¾–1¾ in. ; blades drawn out into a point at apex, often narrowed towards base and broadest in upper half, margins entire or toothed, especially upwards, 3–4½ in. long, 2⅓–3 times as long as broad. Fruit oval, up to ¾ in. long, outer fleshy part acid (F.M.B.), inner hard part (putamen) deeply pitted and 1-celled and 1-seeded, seed ⅜–½ in. long.—Mullumbimby (Maid. and Betche) to Fraser Id.

Elaeocarpus grandis F.v.M. Quandong, Blue Quandong, Blue Fig, Cooloon, White Quandong. Figs. 160 and 161.

Derivation.—Elaeocarpus from Greek *elaia*, the olive tree ; *karpos*, fruit (probably alluding to the resemblance of the fruit of the first species of the genus to the olive) ; Latin *grandis*, large.

Description.—A large tree attaining a height of about 120 ft. and a stem diameter of about 4 ft. Stem with large buttresses at the base. Bark grey, slightly wrinkled on large trees but not scaly ; when cut yellowish brown, becoming light yellow towards sapwood ; measuring 1¼ in. thick on a tree with a stem diameter of 4 ft. Surface of sapwood yellow. The old leaves of this species often turn a brilliant red or crimson colour. Leaf-stalks ½–¾ in. long. Leaves alternate, elliptical or narrowly elliptical, margins finely toothed, narrowed at both ends ; midrib, lateral nerves, and net-veins visible on both surfaces ; measurement of leaf-blade, 3–7 in. long, 3–4 times as long as broad. Flowers in narrow inflorescences (racemes). Racemes arising from the branchlets at the scars of fallen leaves and measuring 2–4 in. long. The flowers are often turned to one side and give the raceme a one-sided appearance. Stalk of each flower about ½ in. long. Individual flowers greenish white, ½ in. or more in length. The outermost part of the flower consists of 5 narrow finely pointed sepals about ½ in. long. On the inner side of the sepals and alternating with them are 5 petals, slightly longer than the sepals, and with their apices cut into narrow segments, the longest segment being about ¼ in. long. On the inner side of the petals and shorter than them are the bristle-like stamens, about 70 in number. Each stamen consists almost entirely of the anther and is about ¼ in. long, is finely tubular and clothed with very minute hairs, is borne on a very short stalklet (filament) and opens at the apex by a terminal slit through which the pollen is discharged. The ovary (in centre of flower). is downy with silky hairs and is surmounted by a long style which often protrudes beyond the tips of the petals. The stamens and ovary are situated on a hairy lobed disk. Fruit globular, blue, up to 1¼ in. in diameter, outer part fleshy, enclosing a very hard " stone" (putamen) with a deeply wrinkled surface. The " stone" contains 5 cells some of which are small and rudimentary ; the mature cells each contain a single. dark-coated, narrowly oval seed about ⅖ in. long. Flowering period : June. In fruit, July-August.

Distribution.—Scrubs of coastal area from the Nambucca River, N.S.W. (J. H. Maiden), to the Endeavour River, North Queensland.

Uses.—The wood is useful for general indoor work although it is not highly figured. It is a light, pale, fairly soft wood and has been used more than many of the light woods of the scrubs. The pores of the wood are single or in radial rows, up to 4 in row ; soft tissue inconspicuous. The deeply wrinkled hard " stone" is used for making ornamental appendages such as necklaces.

Reference.—*Elaeocarpus grandis* F.v.M., Fragmenta Phytographiae Australiae, vol. 2, p. 81, 1860–1861.

2. SLOANEA.

Sloanea australis F.v.M. Maiden's Blush, Cudgeree (more generally applied to *Flindersia Schottiana*), Blush Carrobean. Figs. 162 and 163.

Derivation.—Sloanea, after Sir Hans Sloane ; Latin *australis*, southern.

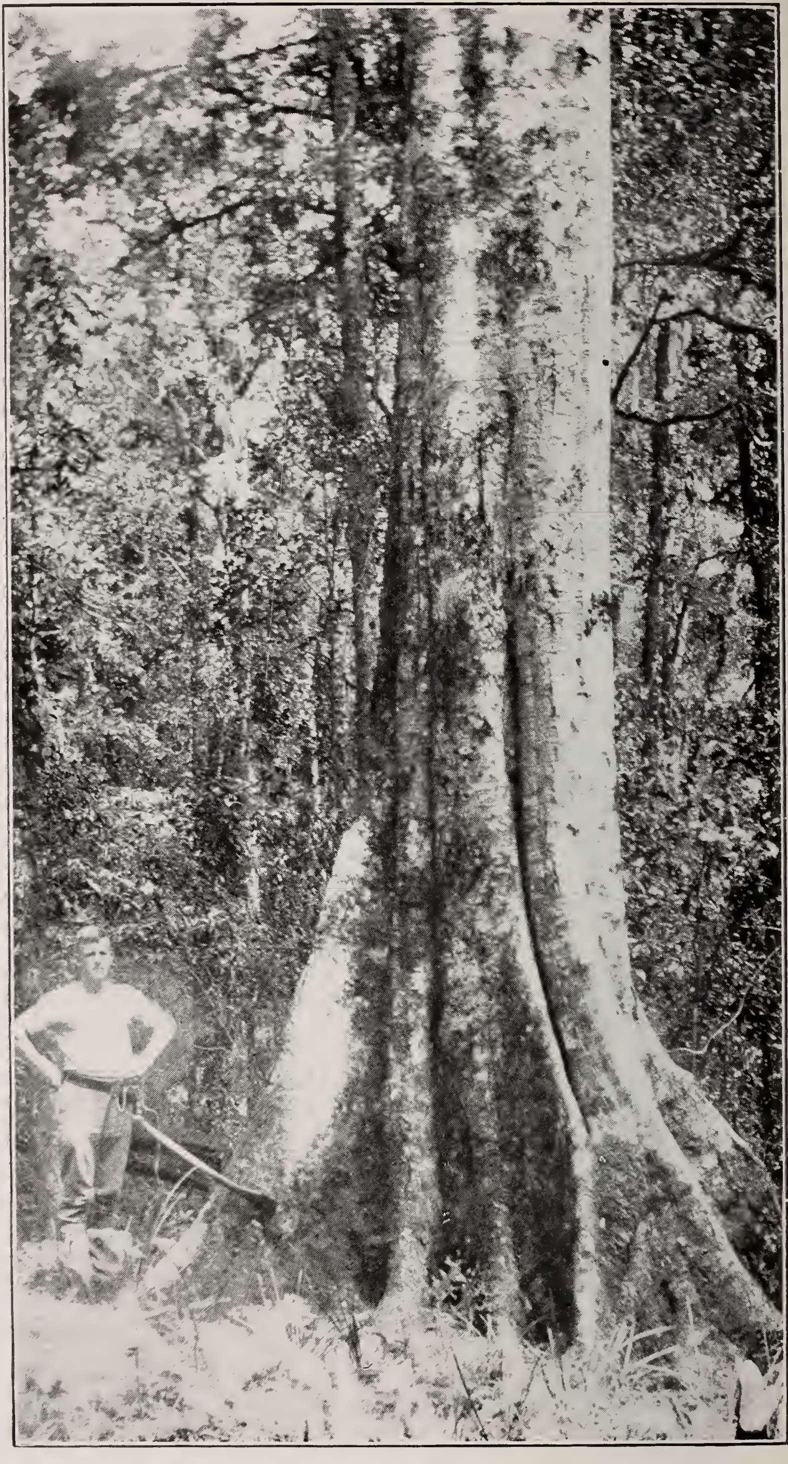


Fig. 156.—Blue Berry Ash (*Elaeocarpus obovatus*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

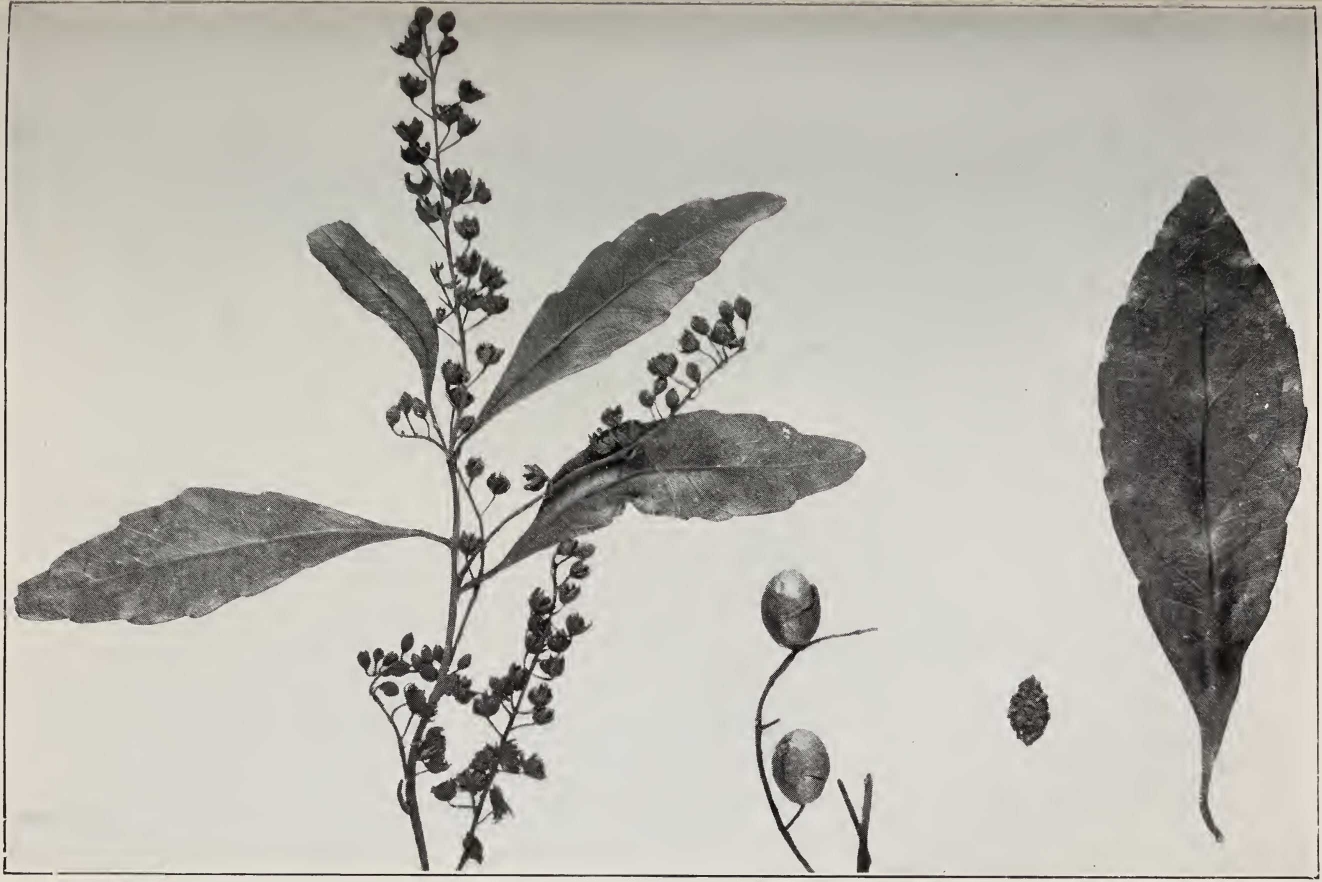


Fig. 157.—Blue Berry Ash (*Elaeocarpus obovatus*). Inflorescence-bearing twig on left; leaf showing underside on right; fruit-bearing twig towards middle, and to right of it fruit with outer fleshy part removed and showing tuberculate hard inner part. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

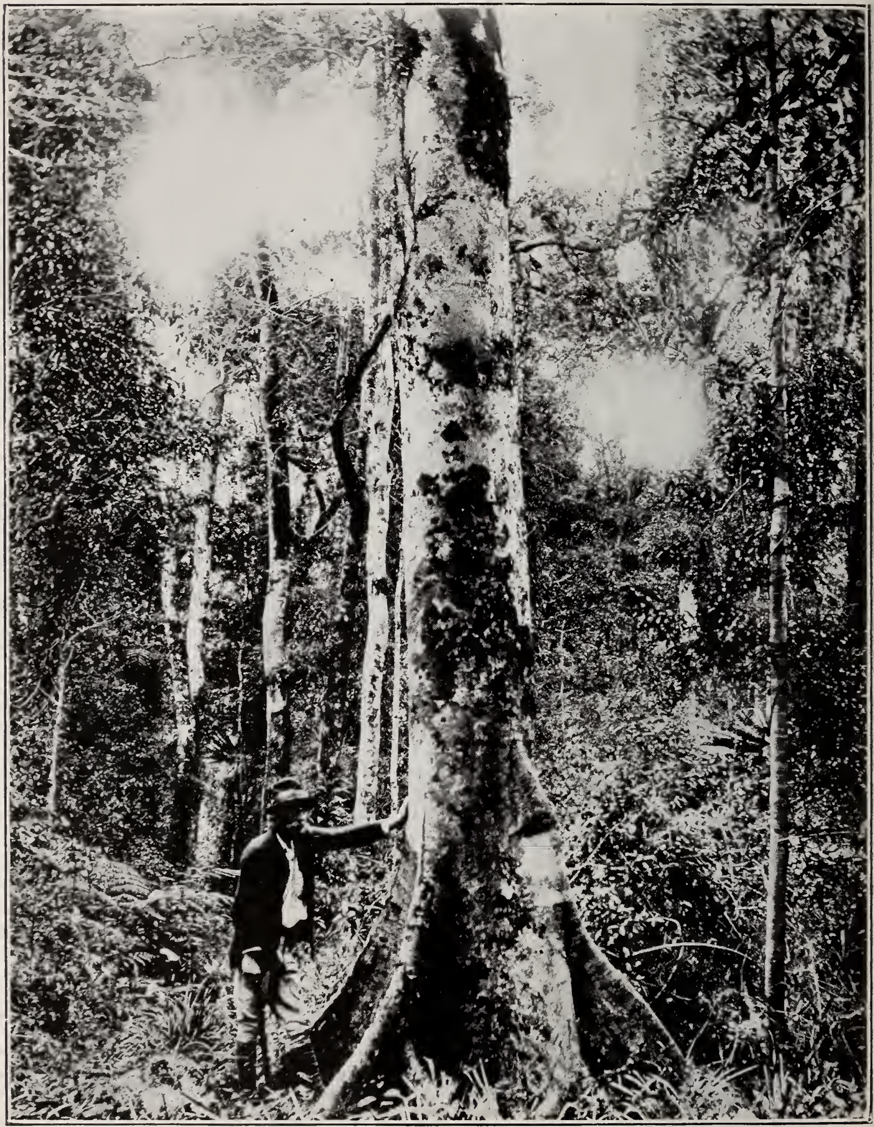


Fig. 158.—Whitewood (*Elaeocarpus Kirtonii*). Roberts Plateau, Macpherson Range, about 28.3° S.

(*Photo.: W. D. F.*)

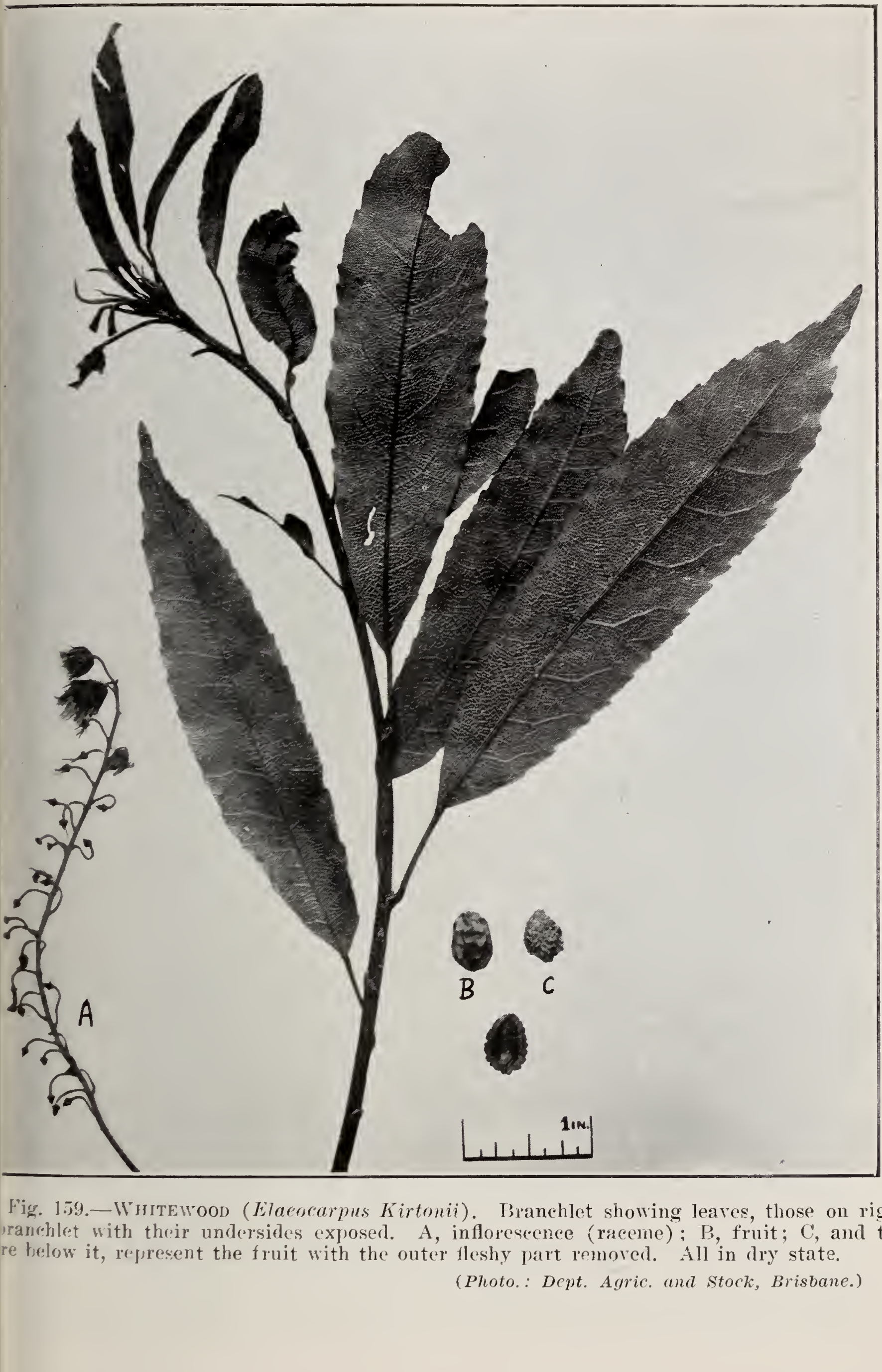


Fig. 159.—Whitewood (*Elaeocarpus Kirtonii*). Branchlet showing leaves, those on right ranchlet with their undersides exposed. A, inflorescence (raceme); B, fruit; C, and the re below it, represent the fruit with the outer fleshy part removed. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

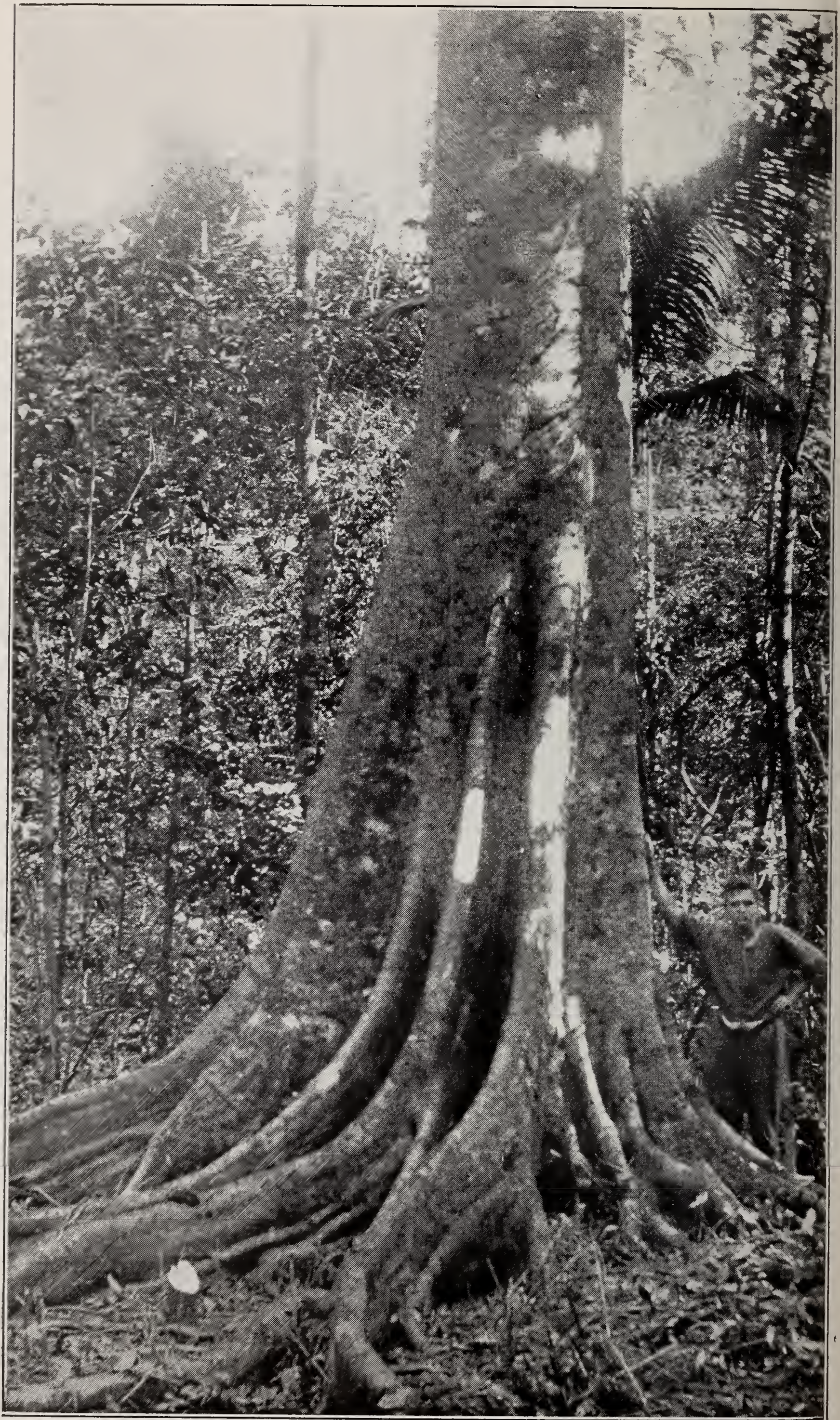


Fig. 160.—Blue Quandong (*Elaeocarpus grandis*). Traveston, about 26.3° S. T fine, longitudinal wrinkles are faintly shown on the bark in a light-coloured patch abo middle of picture. Leaves of *Archontophoenix Cunninghamii* on upper right.

(*Photo.: W. D. F.*)

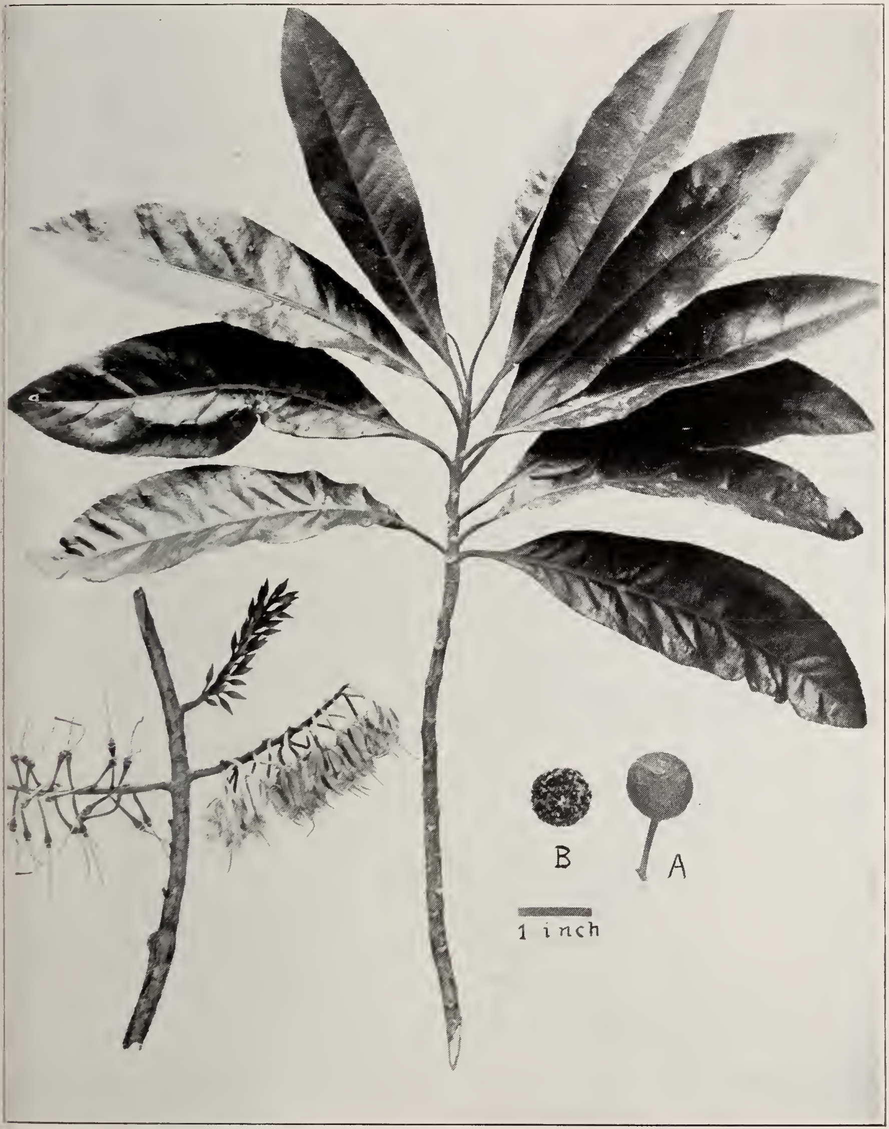


Fig. 161.—Blue Quandong (*Elaeocarpus grandis*). Inflorescence-bearing branchlet on ft; leaf-bearing branchlet in middle. Both in fresh state. A, fruit; B, fruit with outer eshy covering removed to show the inner, deeply wrinkled part of fruit; A and B in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

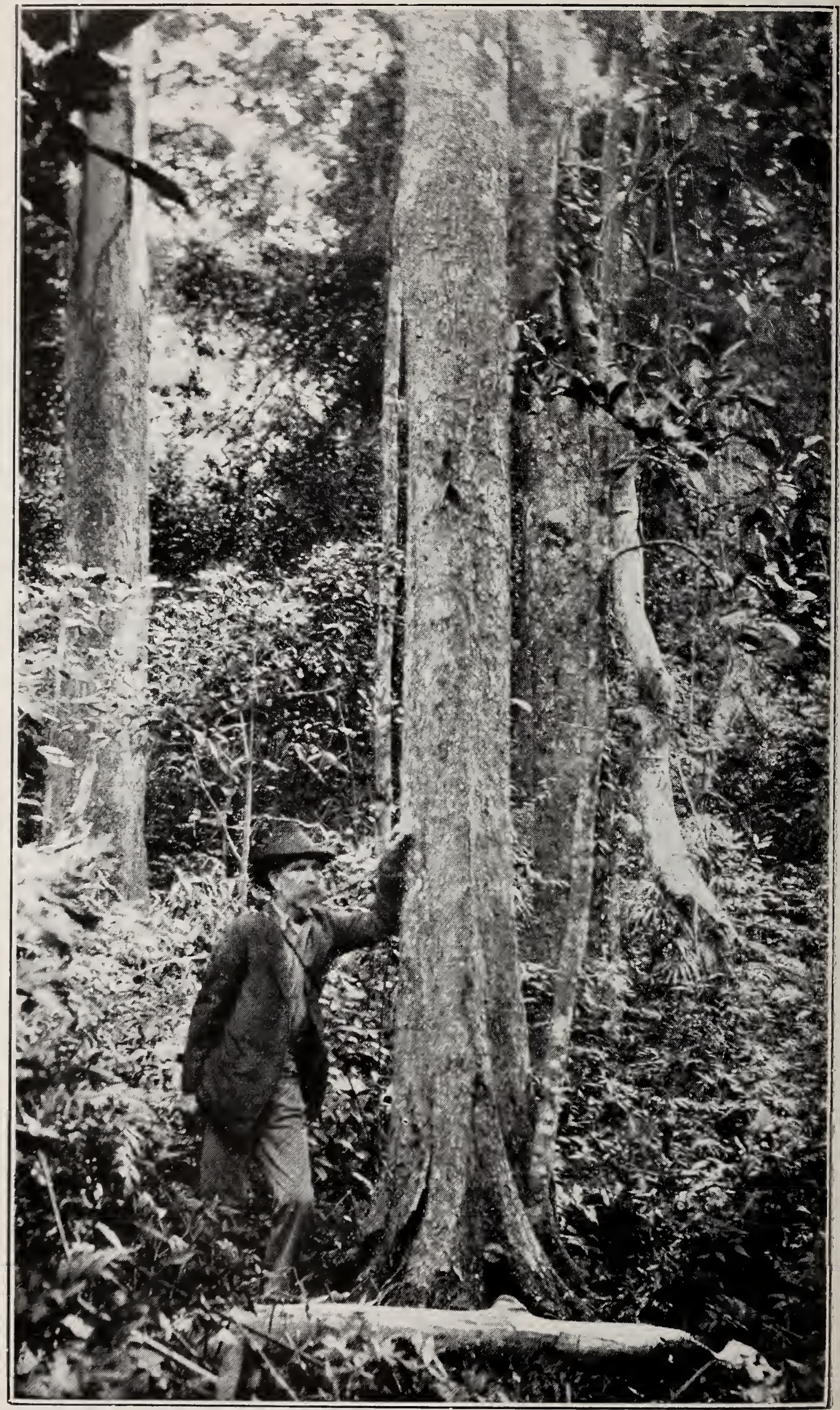


Fig. 162.—Maiden's Blush (*Sloanea australis*). Tambourine Mountain, about 28° S. The trees are often less erect than this one.

(*Photo.: W. D. F.*)

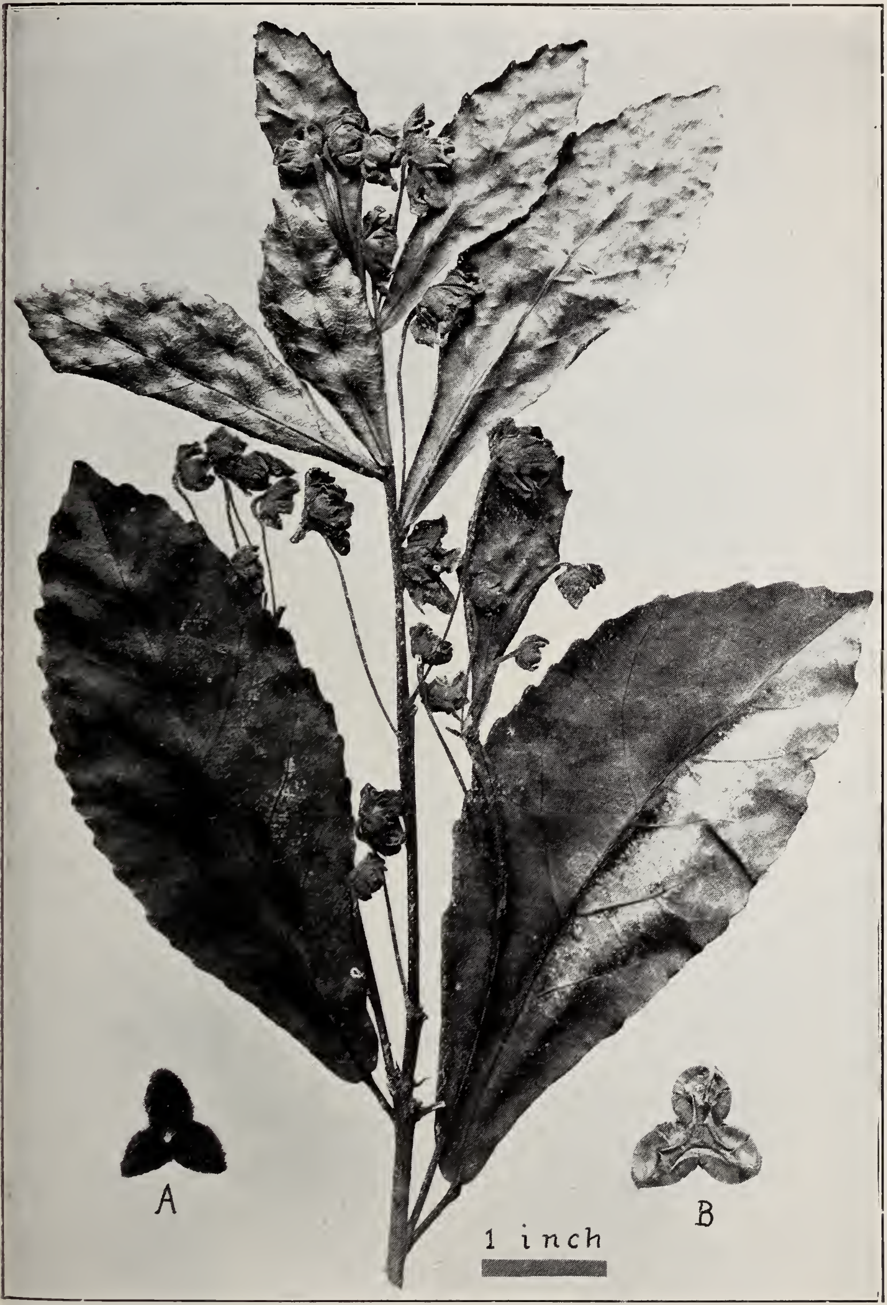


Fig. 163.—MAIDEN'S BLUSH (*Sloanea australis*). Flower-bearing branchlet. A, capsule from below; B, capsule from above. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Description.—A tree attaining a height of about 100 ft. and a stem diameter of about 2 ft. The stem is often irregular and crooked and is not so deeply buttressed at the base as *Sloanea Woollsii* or *Tarrietia Argyrodendron.* Leafy shoots are often found springing from the stem. Bark mostly brown in colour with a more or less marked tendency to scaliness. Heartwood pink or reddish when freshly cut. Leaf-stalks ¼–1 in. long. Leaves alternate. Leaf-blade reversed egg-shaped or nearly elliptical in outline, rounded or protracted into a short blunt point at the apex, tapering towards but abruptly terminating at the base, margins toothed or coarsely toothed ; midrib, lateral nerves, and net-veins raised and more conspicuous on the underside ; measurement of leaf-blade, 3–7 in. long, 2–2½ times as long as broad. Flowers downy, single or in inflorescences (racemes) at the ends of branchlets or in the forks of the leaves. Stalks of individual flowers slender, ¾–2 in. long. Individual flowers large, about 1 in. in diameter when expanded ; the lowermost part, the calyx, divided to its base into 4 or 5 lobes which are egg-shaped in outline and measure about ¼ in. long. On the inner side of the calyx and alternating with its lobes are 4 or 5 cream-coloured petals, oval in outline and each measuring about ½ in. long. On the inner side of the petals are numerous (over 40) bristle-like stamens about ⅕ in. long. The stamens consist almost entirely of the anthers as their stalklets (filaments) are exceedingly short ; the anthers are narrowly lance-shaped, ⅙ in. long, and covered with fine hairs ; the pollen is discharged from two slits in each anther ; the slits are situated at the sides of the anthers in the upper part. The ovary, in the centre of the flower, is egg-shaped and densely hairy and tapers into a narrow style about ⅛ in. long. The ovary and stamens are inserted on a hairy disk. Fruit 3–5 (mostly 4) celled, covered on the outside with minute densely packed bristles, opening in 3–5 valves, each valve measuring ½–¾ in. long and about ⅜ in. in breadth. Seeds 1 or 2 in each cell of the fruit, egg-shaped, about ¼ in. long, black and shining. In the fresh fruit the seeds are enveloped in a scarlet pulp (arillus). Flowering period : October and November.

Distribution.—Coastal scrubs from Illawarra district, N.S.W. (C. Moore), to Atherton Tableland, North Queensland.

Uses.—The timber should be useful for general indoor fittings.

Remarks.—This tree resembles *Pennantia Cunninghamii* in the following peculiarities :—It is often found on creek-sides, the stem is frequently irregular, crooked, or leaning, and leafy shoots are often found springing from the stem.

References.—*Sloanea australis* F.v.M., Fragmenta Phytographiae Australiae, vol. iv., p. 91, 1863–1864 ; *Echinocarpus australis* Bentham in Journal of Linnean Society v., Suppl. ii., 73.

Sloanea Woollsii F.v.M. Carribin, Carrabean, Yellow Caribeen, Grey Carrobean. Figs. 164, 165, 166, 167, 2.

Derivation.—Sloanea, after Sir Hans Sloane ; Woollsii, after Rev. Dr. William Woolls.

Description.—A large tree attaining 140 ft. in height and a stem diameter of 4 ft. Stem mostly very prominently and deeply buttressed at the base, the buttresses sometimes extending 12 or 14 ft. up the stem. Bark brown or brownish grey, mostly wrinkled and with small warts disposed in the wrinkles or grooves ; when cut, reddish brown. lighter towards sapwood ; 1 in. thick on a tree with a stem diameter of 3 ft. 9 in. Sapwood white. Young shoots and flowers finely downy. Leaf-stalks ½–1¾ in. long. Leaves alternate, elliptical in outline, protracted into a point at the apex, margins toothed, lateral nerves and net-veins visible on both surfaces ; measurement of leaf-blade, 3–5 in. long, 2¾–3¾ times as long as broad. The leaf-blades sometimes attain 7 in. in length on young, luxuriant shoots. Flowers in narrow inflorescences (racemes) in the forks of the leaves, the racemes generally shorter than the leaves. Stalks of individual flowers ½–1½ in. long. Flowers about ½ in. in diameter when expanded ; the outermost and largest part, the calyx, consisting of 4 or 5 broad lobes over ¼ in. long. There are no petals. Surrounded by the calyx lobes are numerous (over 20) bristle-like stamens composed of anthers with exceedingly short stalklets (filaments). The stamens are very narrow, measuring slightly less than ⅒ in. in length ; the anthers are covered with very minute hairs ; the pollen is discharged from each anther through two minute round apertures situated towards the inner side of the anthers below the summit. The ovary, in the centre of the flower, is hairy, egg-shaped, and tapers at the apex into a rather short style. The ovary and stamens are situated upon a hairy disk. Capsule oval, about ¾ in. long, 2-celled, splitting open in 2 valves, covered on the outside by rigid slender prickles about ⅕ in. long. Seeds generally solitary in each cell, narrowly oval, about ¼ in. long, attached near apex of capsule valves and pendent, covered except at apex by a reddish-brown coating (arillode). Flowering period : About October.

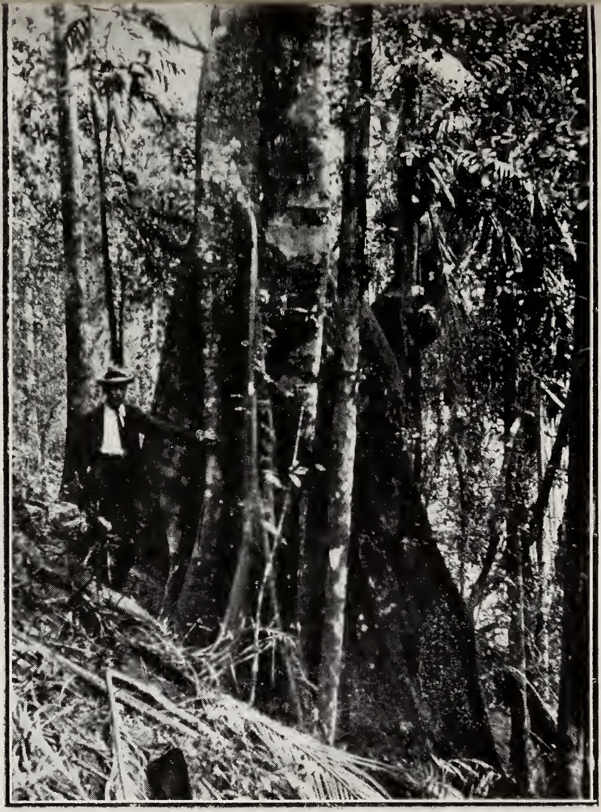


Fig. 164.—Carribin (*Sloanea Woollsii*). Tambourine Mountain, about 28° S. The large outwardly curving buttresses are shown. (*Photo.: J. E. Young.*)

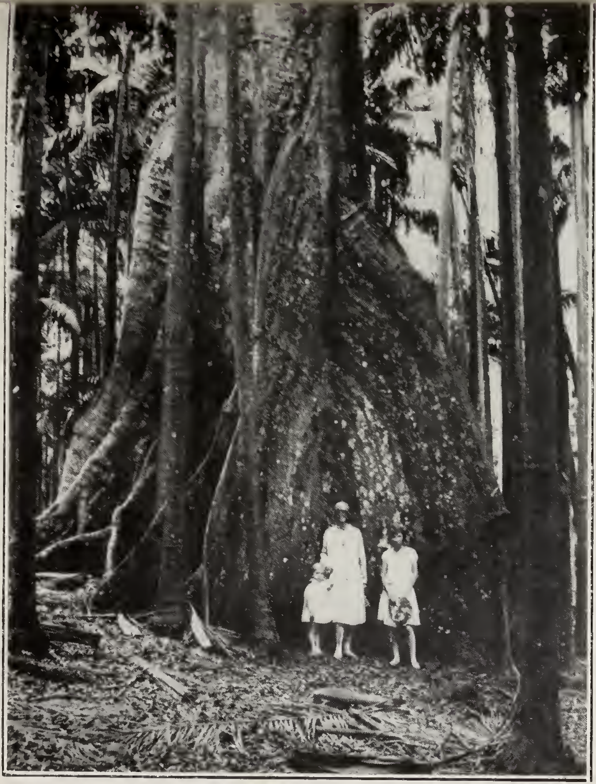


Fig. 165.—Carribin (*Sloanea Woollsii*), Tambourine Mountain, about 28° S. The very large, outwardly curving buttresses are shown. Two trees of the species are shown; the second one is in background on left. (*Photo.: A. E. Colk.*)

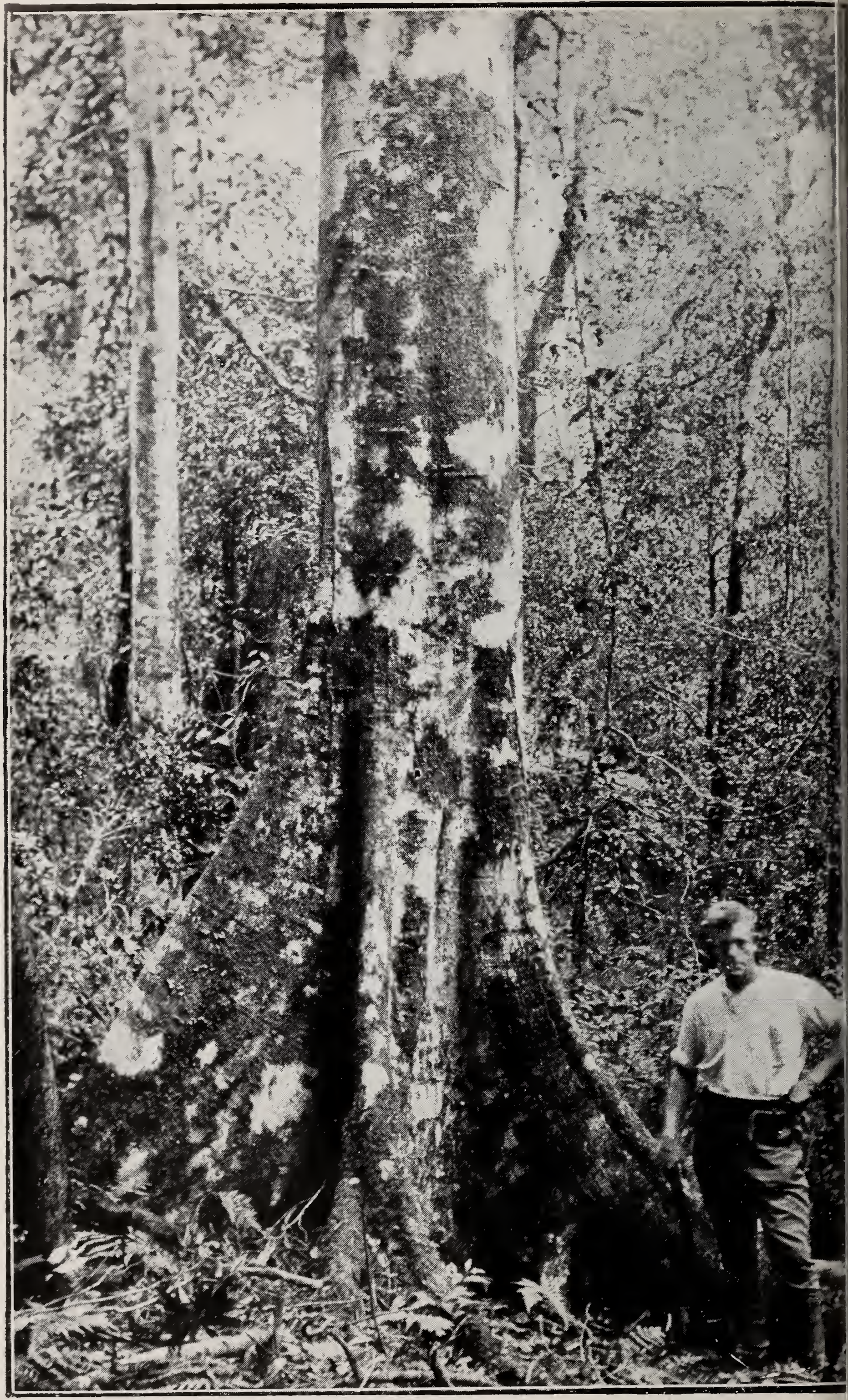


Fig. 166.—Carribin (*Sloanea Woollsii*). Ranges east of Emu Vale, near Killarn about 28.4° S. The light-coloured patches on the bark are lichens. The small pustules the bark are shown in the upper portion.

(*Photo.: W. D. F.*)

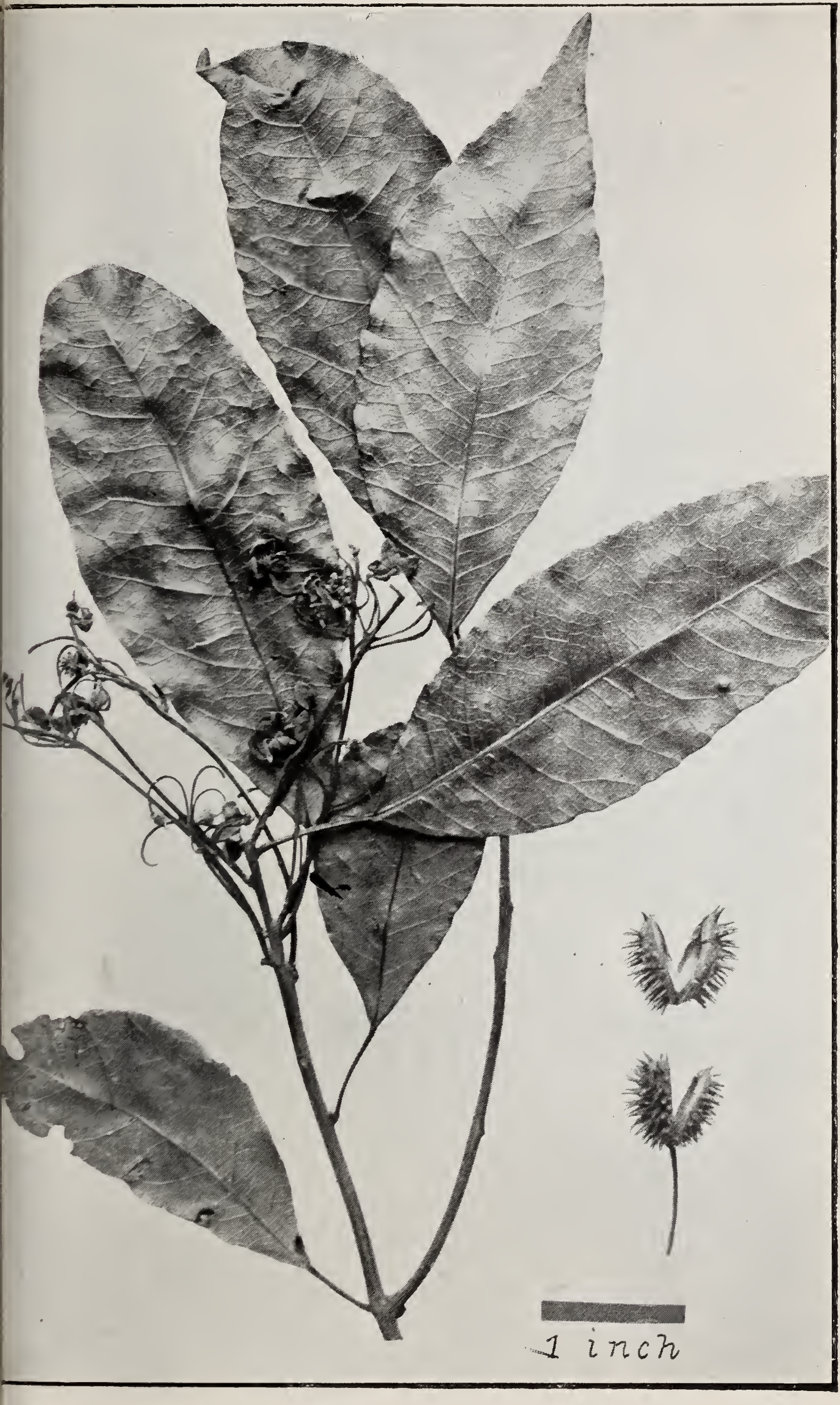


Fig. 167.—Carribin (*Sloanea Woollsii*). Inflorescence-bearing branchlet. Empty capsules on right. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Distribution.—A common tree in the scrubs of the Macpherson Range, ranges about Killarney. Mistake Range, Tambourine Mountain, North Coast line as far north as Gympie. Northern Rivers of N. S. Wales (C. Moore).

Uses.—The timber should be useful for general indoor work such as fittings and cabinet-making.

Reference.—*Sloanea Woollsii* F.v.M., Fragmenta Phytographiae Australiae, vol. vi., p. 171, 1867–1868. K. Domin (Bibl. Botanica, 89, 4, 926, 1927) contends that this species is distinct from *Sloanea Woollsii* and he has named it as a new species under *Sloanea austroqueenslandica*.

Family STERCULIACEAE.

Fruit carpels 1–5, boat-shaped, spreading, dehiscent and containing several seeds.	
Seeds smooth and shining	1. *Sterculia.*
Seeds more or less surrounded by a hairy or bristly covering ..	2. *Brachychiton.*
Fruit carpels 1–5, separate and spreading, winged at outer end, 1-seeded and indehiscent	3. *Tarrietia.*
Capsule globose, rarely exceeding 1 in. in diameter, 5-valved, covered with long, soft processes	4. *Commersonia.*

1. STERCULIA.

Sterculia quadrifida R.Br. Up to 60 ft. high and 15 in. stem diameter. Wood soft, light and pale. Leaves alternate ; stalks ¾–1½ in. ; blades heart-shaped or egg-shaped in outline, broad and often indented at base, often drawn out into a blunt, short point at apex, resembling in appearance the unlobed leaves of *Brachychiton acerifolium* (*see* Fig. 171), 2¼–3½ in. long, 1½–2 times as long as broad. Flowers structurally similar to those of *Brachychiton acerifolium* (*see* Fig. 171), the calyx hairy, bell-shaped, and ⅜ in. long. Fruit consisting of 1–5 boat-shaped, bright-red follicles 2–3 in. long ; each follicle contains a number of black oval seeds ½–¾ in. long.—Northern N. S. Wales (Moore) to Thursday Id. ; North Australia.

2. BRACHYCHITON.

Brachychiton discolor F.v.M. Scrub Bottle Tree, White Kurrajong. Figs. 168 and 169.

Derivation.—Brachychiton from Greek *brachys*, short ; *chiton*, coat of mail (alluding to the bristles covering the outer coating of the seeds) ; Latin *discolor*, of different colours (signifying the unlikeness in colour of the leaf surfaces).

Description.—A tree attaining over 100 ft. in height and a stem diameter of about 2 ft. 4 in. Stem not flanged at the base, sometimes swelling out above the ground so as to be slightly bottle-shaped. Bark grey, fissured or furrowed, very hard on the outside ; when cut, outer bark dark reddish brown, inner bark yellowish, measuring 1 in. in thickness on a tree with a stem diameter of 2 ft. 3 in. Young shoots, underside of leaves, flowers, and pods hairy or downy, the hairs often star-shaped (stellate) especially on the flowers and on the inside of the pods. Leaf-stalks slender, 2–4 in. long. Leaves alternate, broad, more or less deeply 3-, 5-, or 7-lobed, 4–8 in. in diameter, often pale or yellowish and downy on the underside ; the leaves on seedling and young trees much more deeply divided into lobes than those on older trees. Flowers crowded near the ends of the branchlets and arranged in slender inflorescences (narrow panicles) or the slender inflorescences springing from the forks (axils) of the upper leaves. Individual flowers almost stalkless, very large and conspicuous, red ; the outer part, the calyx, funnel-shaped or bell-shaped, 1½ to nearly 2 in. long, divided almost to the middle into 5 triangular lobes. In male flowers within the calyx is the staminal column, about ¾ in. long ; it is hairy in the lower part and bears at the summit a globular mass of about 15 yellow anthers. In female (or (?) bisexual) flowers the calyx encloses a large 5-lobed ovary tapering at its summit into a style which bears a 5-lobed stigma at its apex ; the ovary is contracted at the base into a short stalk (stipes) ; the basal part of the ovary is surrounded by a number of anthers. Fruit consisting of 3–5 boat-shaped follicles (carpels), the stalks of the follicles less than 1 in. long in our specimens, the follicles themselves measuring 3–5 in. long. The follicles open in a slit along one edge and contain 10–30 oval seeds nearly ½ in. long ; each seed is surrounded by a coating which remains attached to the wall of the carpel after the seed has fallen away. The inside of the carpel is covered by fine, rigid, brown hairs or bristles ; the seeds are arranged in a single layer in the carpels and when they fall away the outer coating which surrounds them forms a honeycomb-like structure which is more or less evident in the carpels of all *Brachychitons*. Flowering period : December and January.

Distribution.—Coastal scrubs from Maryborough, Queensland, to Dungog, 150 miles north of Sydney, N.S.W. (J. H. Maiden). In Queensland it extends to the Bunya Mountains, about 100 miles from the coast.

Wood.—The wood is very soft.

References.—*Brachychiton discolor* F.v.M., Fragmenta Phytographiae Australiae, vol. i., p. 1, 1858–1859 ; *Sterculia discolor* F.v.M. in Bentham's Flora Australiensis, vol. i., p. 228, 1863 ; *Brachychiton luridus* C. Moore in Mueller's Fragmenta Phytographiae Australiae, vol. i., p. 1, 1858–1859 ; *Sterculia lurida* F.v.M. in Bentham's Flora Australiensis, vol. i., p. 228, 1863.

Brachychiton acerifolius F.v.M. Flame Tree, Flame Kurrajong. Figs. 170 and 171.

Derivation.—Brachychiton from Greek *brachys*, short ; *chiton*, coat of mail (alluding to the bristles covering the outer coating of the seeds) ; acerifolius from Latin *acer*, the maple tree ; *folium*, a leaf (the leaf resembles that of the maple).

Description.—A large tree attaining a height of 120 ft. and a stem diameter of 3 ft. Stem not flanged in South Queensland specimens, generally fairly cylindrical. Bark grey or brown, rather prominently fissured or wrinkled in the larger trees ; when cut, white or almost brown in colour, measuring 1⅞ in. thick on a tree with a stem diameter of 2 ft. 6 in. Sapwood white to pale yellow. Branchlets, leaves, and flowers hairless or nearly so. Leaf-stalks long and slender, 2½–9 in. long. Leaves alternate, mostly large, the blade very variable in shape ; on large trees the leaf-blades are frequently entire, narrowly egg-shaped in outline, 4–9 in. long, and 2–3 times as long as broad ; broadly 3-lobed leaves are also common on large trees. On luxuriant shoots and younger trees the leaves are deeply divided towards the stalk into 5 or 7 lobes ; this form of leaf is often broader than long and measures from 4–10 in. in breadth. The narrow entire leaves generally have 3–5 and the lobed leaves 5–7 main nerves arising from the apex of the leaf-stalk. Flowers red, large and conspicuous, in inflorescences (panicles) in the forks of the upper leaves or springing from the scars of the upper fallen leaves, the panicles attaining over 7 in. in length. Stalks of individual flowers about ¼ in. long. Flowers bell-shaped, over ½ in. in diameter. The outermost, bell-shaped part, the calyx, which is the largest part of the flower, bears at its rim 5 triangular lobes over ¼ in. in. length. In male flowers the calyx encloses a staminal column about ¼ in. long, the lower half nearly globular and 5-lobed, the 5 lobes representing abortive (?) carpels, the upper half slender and bearing at its summit a globular mass of 10–20 yellow anthers. In female flowers the calyx encloses 5 yellow carpels (female organs) about ⅙ in. long, tapering into a compound style bearing 5 small rounded stigmas at the summit ; surrounding the carpels at the base are 10–20 anthers (male organs, possibly abortive) irregularly clustered in 5 bundles. Male and female flowers frequently on the same tree. Fruit consisting of 3–5 boat-shaped carpels or follicles, each follicle on a stalk about 3 in. long ; the follicle itself measures about 4 in. long, tapers at the base, and is produced into a point at the apex. Enclosed in the follicles, which open in a slit along one edge, are several or numerous almost oval seeds about ½ in. long, each seed enclosed in an outer loose slightly hairy covering which remains in the carpel after the seed has fallen away. Seeds packed in a single layer. Flowering period : November and December.

Distribution.—Coastal scrubs from Illawarra, N.S.W. (J. H. Maiden), to Rockingham Bay, North Queensland.

Uses.—The wood does not appear to be used. It is very soft in texture and light in weight. The species is frequently cultivated as an ornamental and shade tree.

References.—*Brachychiton acerifolius* F.v.M., Fragmenta Phytographiae Australiae, vol. i., p. 1, 1858–1859 ; *Sterculia acerifolia* A. Cunningham in Lond. Hort. Brit. 392 (partly), Bentham Flora Australiensis, vol. i., p. 229, 1863.

Brachychiton rupestris Terr. Queensland Bottle Tree, Bottle Tree (alluding to the bottle-like shape of the stem), Narrow-leaved Bottle tree. Figs. 172 and 173.

Derivation.—Brachychiton from Greek *brachys*, short ; *chiton*, coat of mail (referring to the bristles covering the outer coating of the seeds) ; rupestris from Latin *rupes*, a rock (alludes to the tree growing among rocks).

Description.—A tree often attaining a large size. The stem is mostly prominently bottle-shaped in the lower part where it sometimes attains a diameter of 6 ft. ; the upper part carries a large dense head of foliage. Bark furrowed or fissured. Leaf-stalks slender, ½–1½ in. long. Leaves alternate, those on flowering and fruiting branchlets often very different in shape from those on barren and luxuriant shoots and seedling plants. Adult leaves narrow, 2–4 in. long, about 3–5 times as long as broad. Seedling

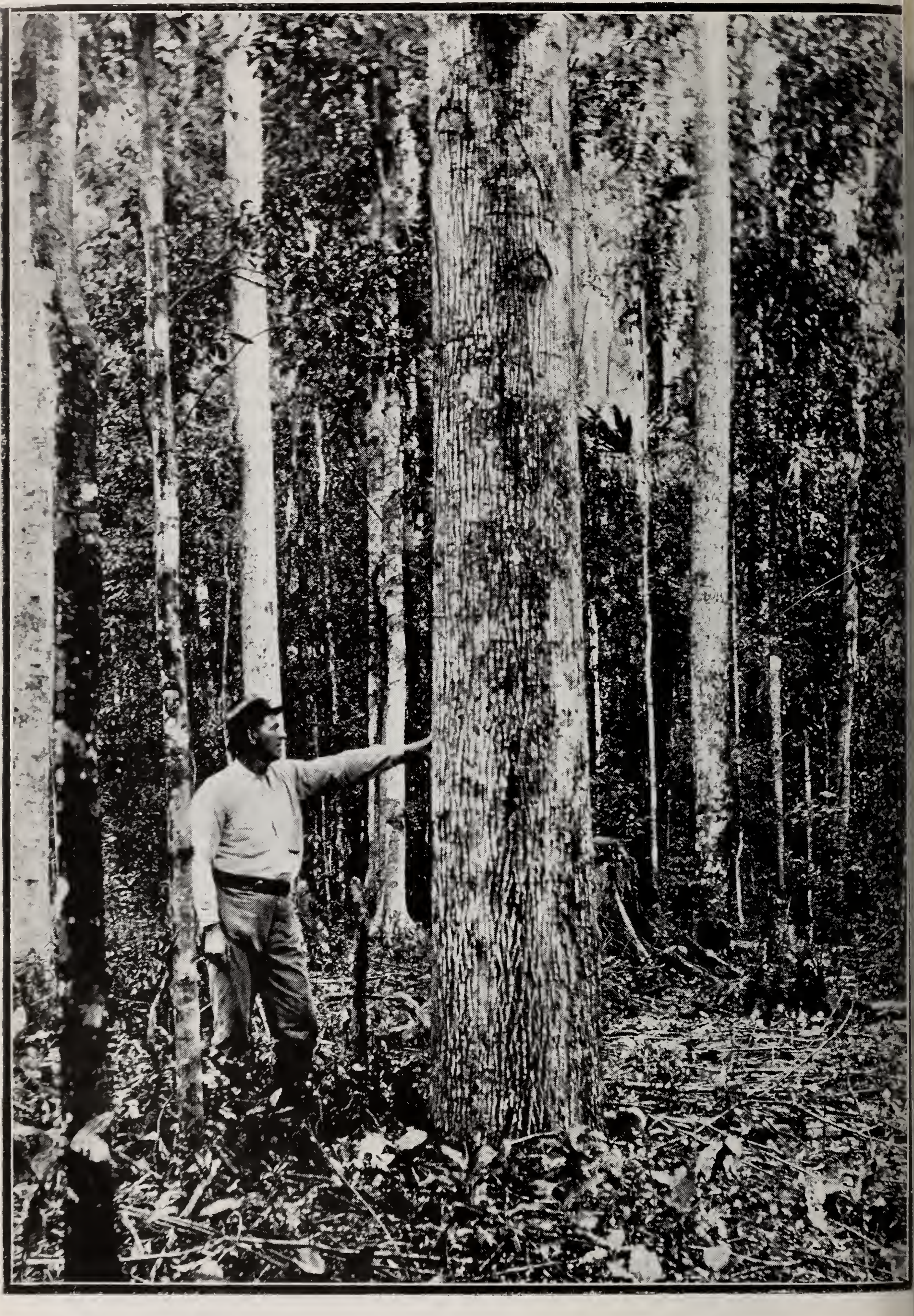


Fig. 168.—Scrub Bottle Tree (*Brachychiton discolor*). Imbil, about 26.4° S. The fissured bark and round base of stem without buttresses or root extensions are shown.

(Photo.: W. D. F.)

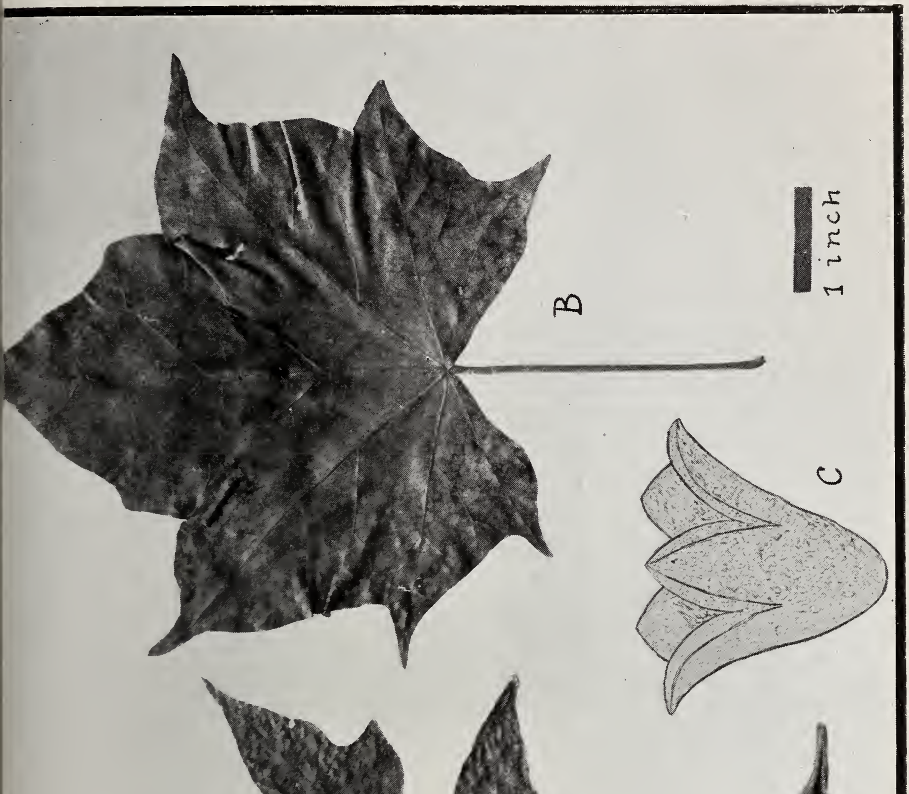


Fig. 169.—Scrub Bottle Tree (*Brachychiton discolor*). A and B, forms of leaf; C, flower (drawn by C. T. White); D, follicle showing the contained seeds. All, except flower, in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

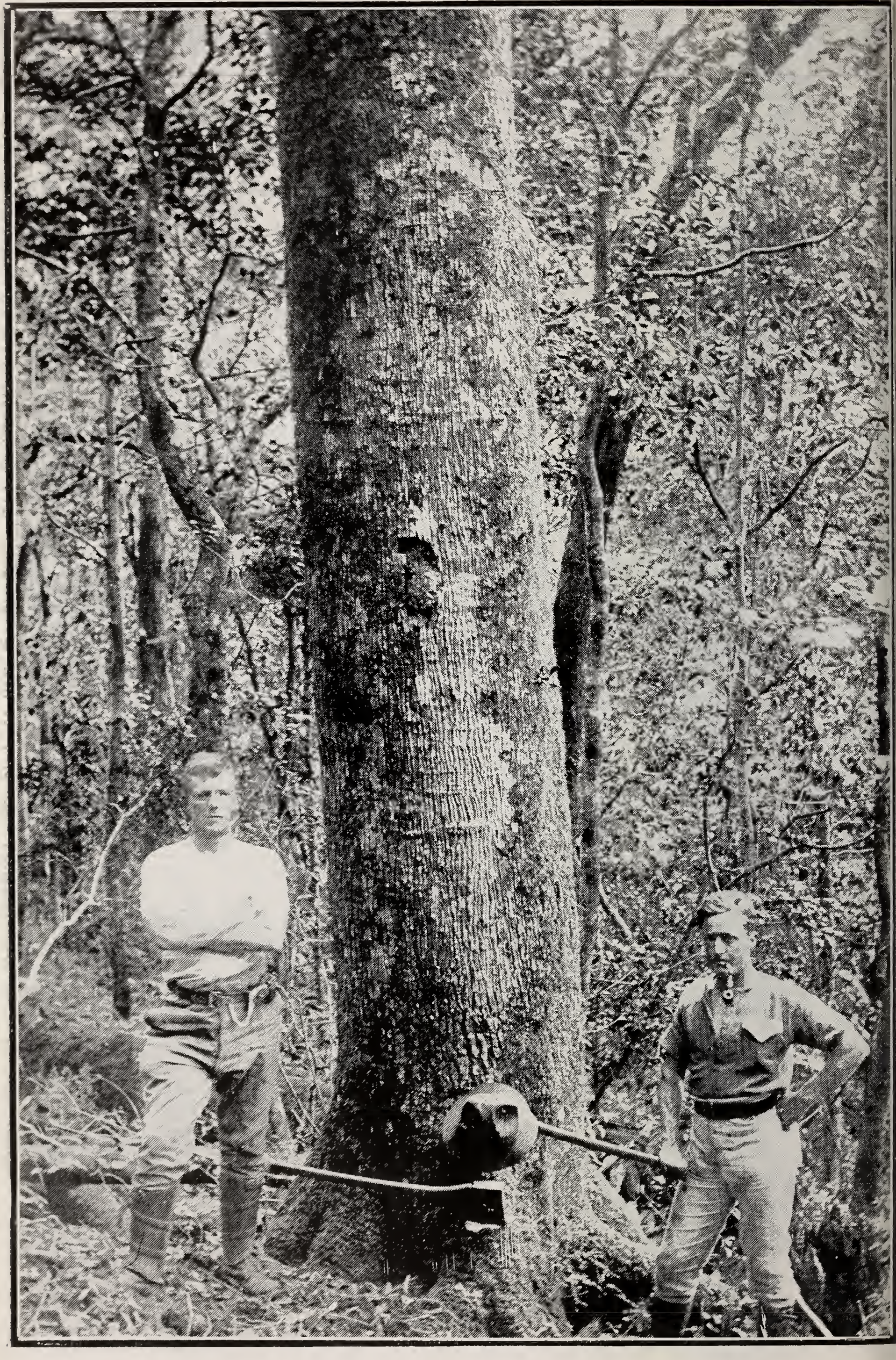


Fig. 170.—Flame Tree (*Brachychiton acerifolius*). Ranges east of Emu Vale, near Killarney, about 28.4° S. The fissured bark is shown.

(*Photo.: W. D. F.*)

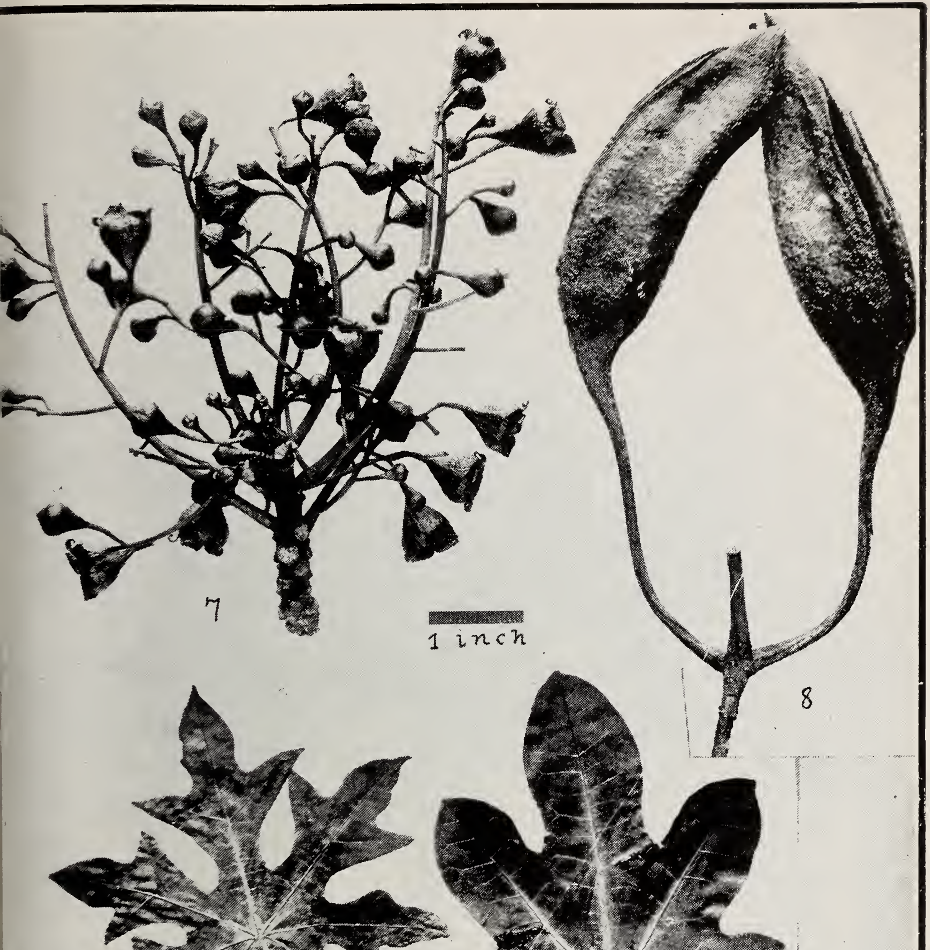


Fig. 171.—Flame Tree (*Brachychiton acerifolius*). 1-6 different forms of leaf to scale near 6; 7, inflorescence; 8, fruit-bearing stalk with two follicles; 7-8 to inch scale. in dry state except 7. 1-6 from C. T. White's "Forest Botany."

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

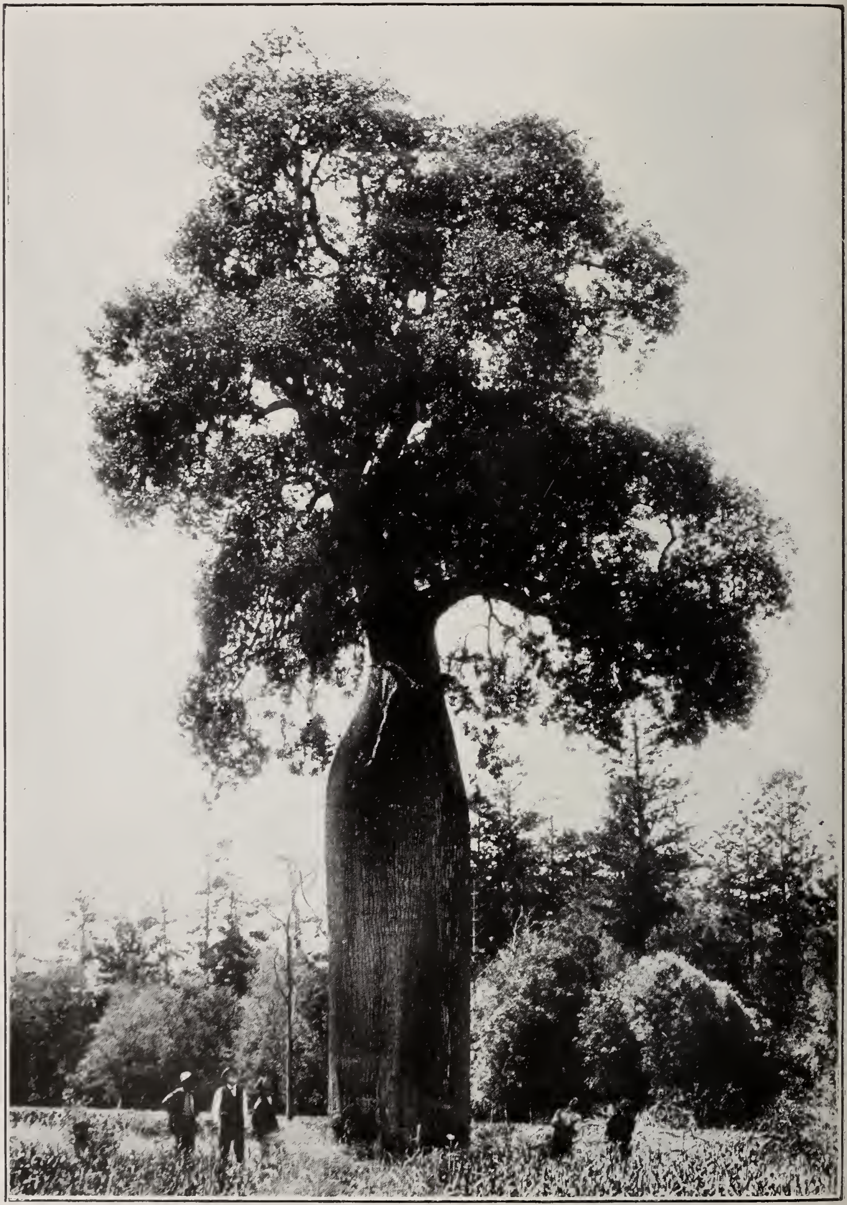


Fig. 172.—Queensland Bottle Tree (*Brachychiton rupestris*). Cleared scrub, Kilkivan, about 26° S. Trees on skyline in background on right are Hoop Pines (*Araucaria Cunninghamii*).

(*Photo: G. E. Fryer.*)

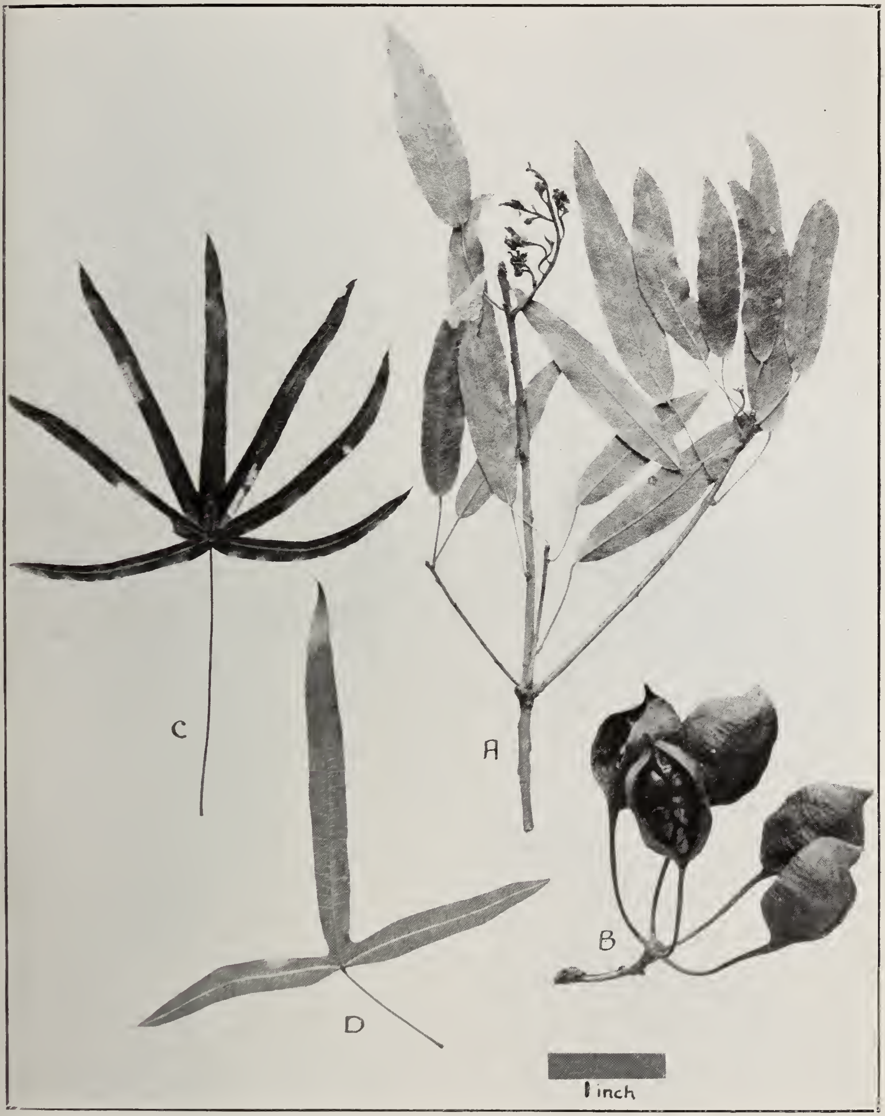


Fig. 173.—Queensland Bottle Tree (*Brachychiton rupestris*). A, branchlets bearing n inflorescence; B, portion of fruit-bearing twig with fruiting stalk bearing five follicles; and D, forms of leaves on young trees and sterile twigs. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

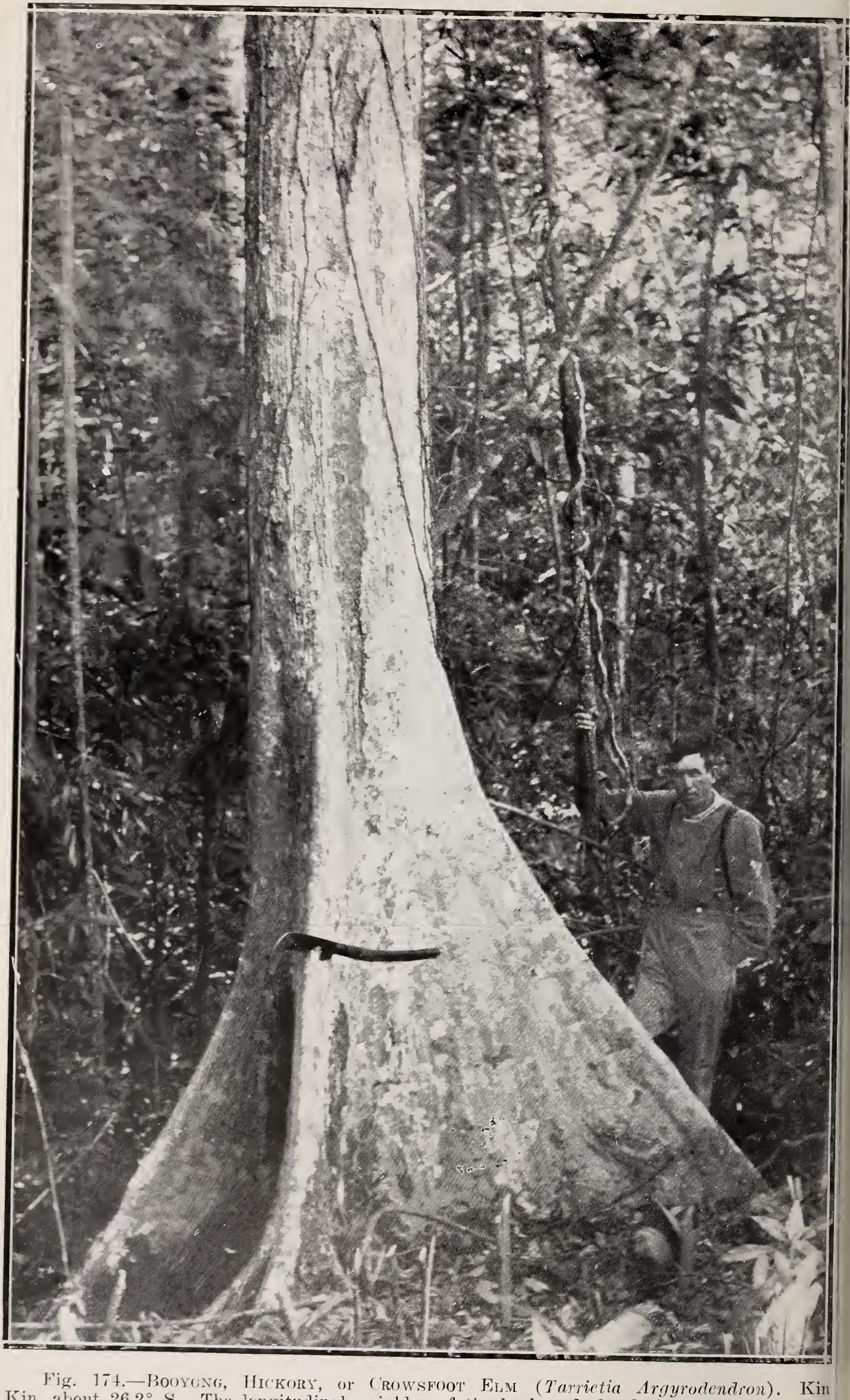


Fig. 174.—Booyong, Hickory, or Crowsfoot Elm (*Tarrietia Argyrodendron*). Kin Kin, about 26.2° S. The longitudinal wrinkles of the bark and the darker surface exposed by the falling away of the outer bark are shown in upper part. In the upper part the dark lines on the tree-stem are the clinging stems of *Pothos Loureiri*, a climbing Aroid.

(*Photo.: W. D. F.*)

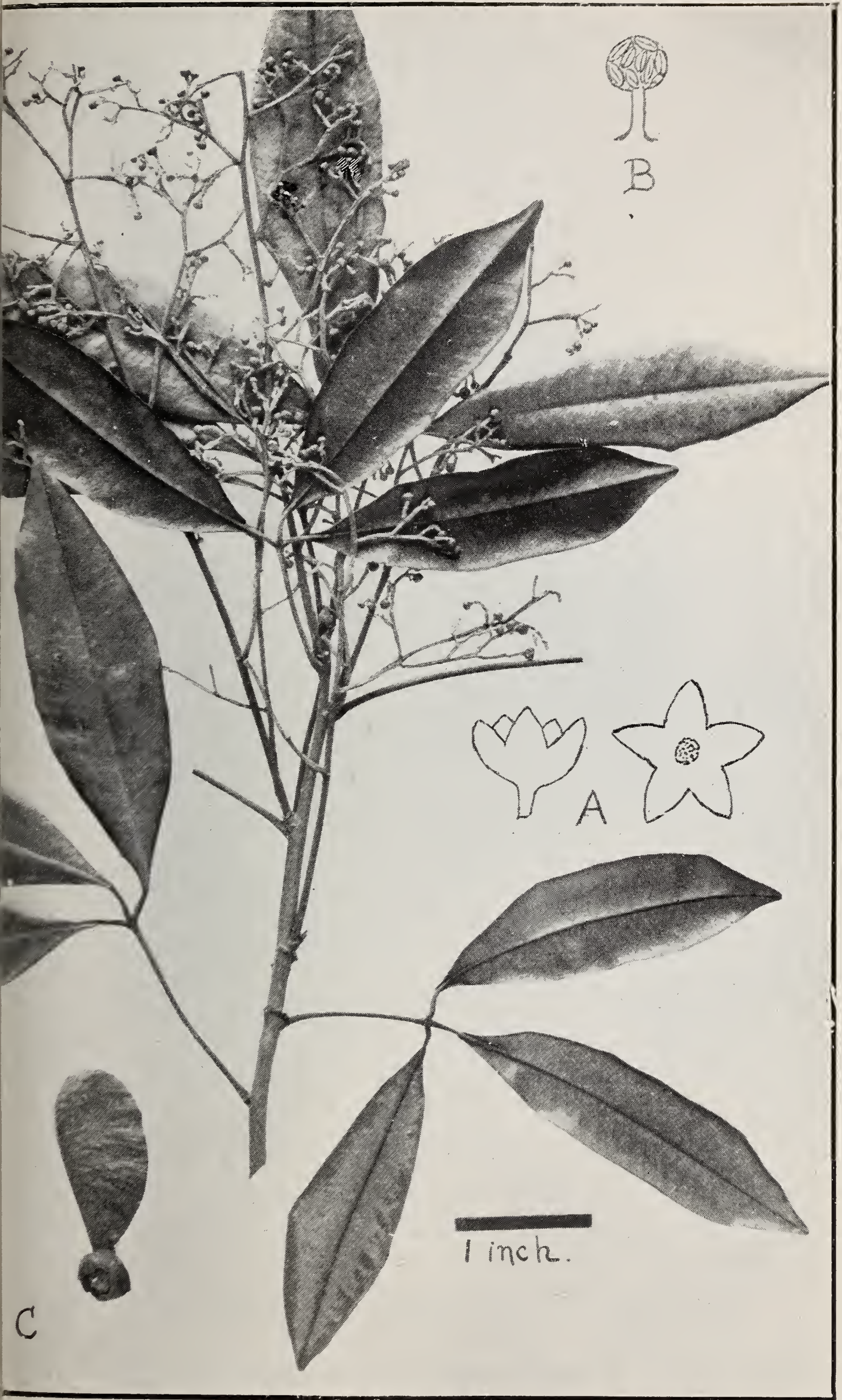


Fig. 175.—Booyong, Hickory, or Crowsfoot Elm (*Tarrietia Argyrodendron*). A, wer enlarged; B, staminal column enlarged; C, carpel. The branchlet is inflorescence-aring. The inch scale applies to all figures except A and B. (B drawn by C. T. White.) in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

and coppice ("sucker") leaves divided to the base into 3–9 narrow leaf-like segments and usually on much longer stalks than the adult leaves. Flowers in inflorescences (panicles) in the forks of the leaves or springing from the scars of fallen leaves, the panicles often shorter than the leaves. Stalks of individual flowers distinct. Flowers ½ in. or more in diameter when expanded; the outermost and largest part, the calyx, finely downy and divided almost to the flower-stalk into 5 narrow lobes, each lobe measuring about ¼ in. in length. Petals none. Each flower contains either one or both sexes. Within the calyx in male flowers is the staminal column, which occupies the central part of the flower and consists of a column about ⅛ in. long bearing a rounded mass of 10 or 15 yellow anthers (small pollen-containing bodies) at its apex. In female flowers the stamens are rudimentary or sterile, and the central part of the flower is occupied by the 5-lobed, finely downy ovary. The fruit consists of 3–5 pod-like carpels (follicles), each on a stalk 1 in. or more in length. The follicles are 1–1½ in. long, have a prominent beak at the end, open in a slit on one side, and contain 4–15 seeds. Outer covering of seeds thin, loose, and hairy at one end, remaining in the inside of the carpels after the seeds have fallen out. Seeds oval and slightly angular, about ¼ in. long, packed in a single layer on the inner walls of the carpels.

Distribution.—Limited to Queensland—Darling Downs, Maranoa, Warrego, Port Curtis, Burnett, and Leichhardt districts. The trees are very frequent in some of the drier scrubs such as that at Marmor, south of Rockhampton. It is only on this account that the species is included in this book. The species is rarely, if ever, found in luxuriant rain forests.

Uses.—Its chief use is for fodder. Practically the whole of the green plant is edible, and it is regarded as the most important native fodder tree in the districts in which it grows. The wood is very soft.

References.—*Brachychiton rupestris* Terr. in Boll. Ort. Palermo, i., 62; *Sterculia rupestris* Bentham, Flora Australiensis, vol. i., p. 230, 1863.

3. TARRIETIA.

Tarrietia Argyrodendron Benth. Booyong, Hickory, Crowsfoot Elm, Stavewood, Silky Elm, Brown Oak, Tulip Oak. Figs. 174, 175, 2.

Derivation.—Tarrietia is derived from the native Javanese name for the original species of the genus, *Tarrietia javanica*; Argyrodendron from Greek *argyros*, silver; *dendron*, a tree (alluding to the sheen on the underside of the leaflets). Argyrodendron was the generic name proposed for the species by F. v. Mueller.

Description.—A large tree attaining 140 ft. in height and a stem diameter of 4 ft. Stem mostly widely buttressed at the base and cylindrical above the buttresses. Bark grey or brown, mostly longitudinally fissured or wrinkled, sometimes fairly rough; when cut, reddish brown, measuring ⅝ in. thick on a tree with a stem diameter of 1 ft. 10 in. Young branchlets, underside of leaves, and inflorescence covered by a silvery or coppery scurf of minute scales which when examined by a powerful lens are seen to be wheel-shaped. Each leaf consists of 3 leaflets (occasionally reduced to 1 or 2 only) which proceed from the same point at the top of the common leaf-stalk. Leaves alternate. Common leaf-stalks slender, varying in length from ½–4 in. Each leaflet is attached to the top of the common leaf-stalk by a stalklet varying in length from $\frac{1}{12}$ to nearly ½ in. long. Leaflets elliptical, gradually tapering towards the base, often drawn out into a narrow point at the apex; measurement of blade, 3–5 in. long, 2½–4 times as long as broad. Flowers in much-branched inflorescences (panicles) arising from the forks (axils) of the leaves, the panicles sometimes longer than the leaves. Flowers on distinct slender stalks. Individual flowers about ¼ in. in diameter; the outer (and largest) part of the flower, the calyx, is broadly bell-shaped with 5 triangular lobes at the rim. Petals none. Perfect male and female organs in separate flowers. On the inner side of the calyx in the male flowers are the stamens, which are united into a column bearing a small round mass of 10 or more anthers at the summit. On the inner side of the calyx and slightly shorter than it in the female flowers are the 3–5 more or less distinct carpels which taper at the apex into as many styles. When mature the carpels constitute the fruit, at which stage they are separate from each other, and each carpel consists of a brown body containing a round seed at the base and extended upwards into a thin flat wing above 1 in. long and ½ in. wide. Flowering period: September.

Distribution.—One of the most common species in subtropical scrubs. Manning River, N.S.W. (Maiden), to Endeavour River, North Queensland.

Varieties.—Var. 1, *grandiflora* Benth. Flowers larger than the ordinary form, ⅓ in. in diameter. Port Denison (Bowen).—Var. 2, *angustifolia* Bail. Leaflets narrow, often under ½ in. wide. Endeavour River.—Var. 3, *macrophylla* Bail. Leaflets large,

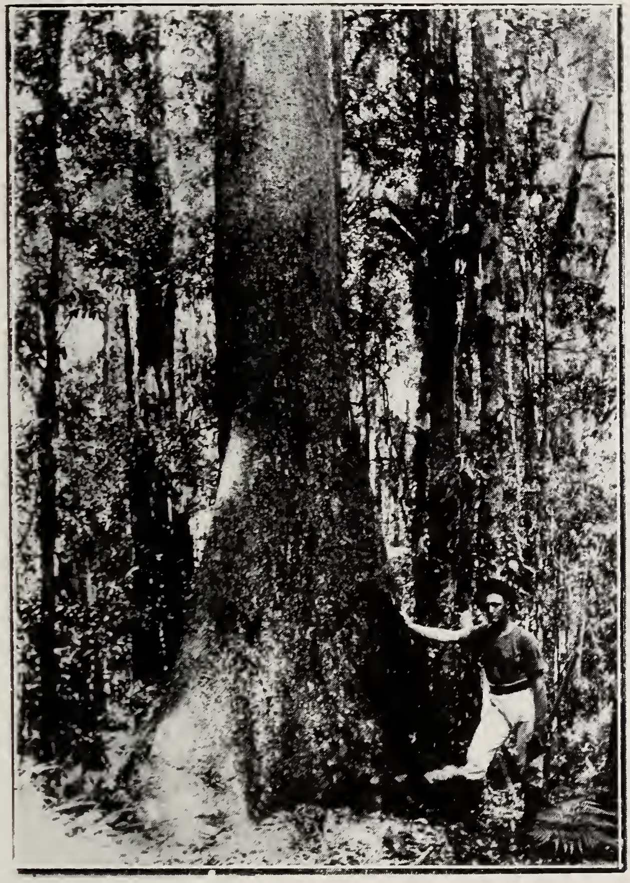


Fig. 176.—Black Jack (*Tarrietia actinophylla*). Ranges east of Emu Vale, near Killarney, about 28.4° S.

(*Photo.: W. D. F.*)

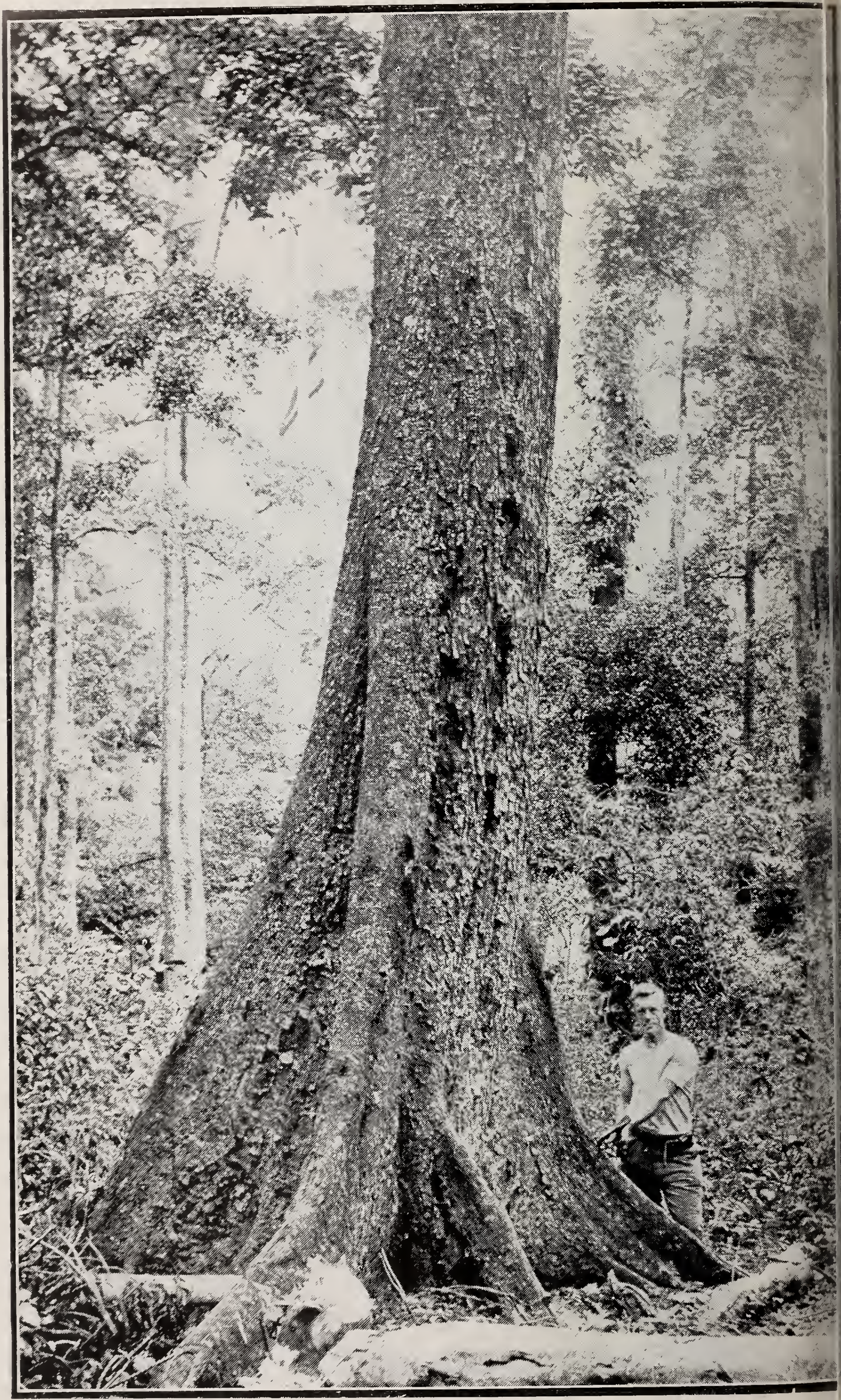


Fig. 177.—Black Jack (*Tarrietia actinophylla*). Ranges east of Emu Vale, Killarney, about 28.4° S. The scaly character of the bark is shown. Occasionally the t have a somewhat less scaly bark than this one. (*Photo.: W. D. F.*

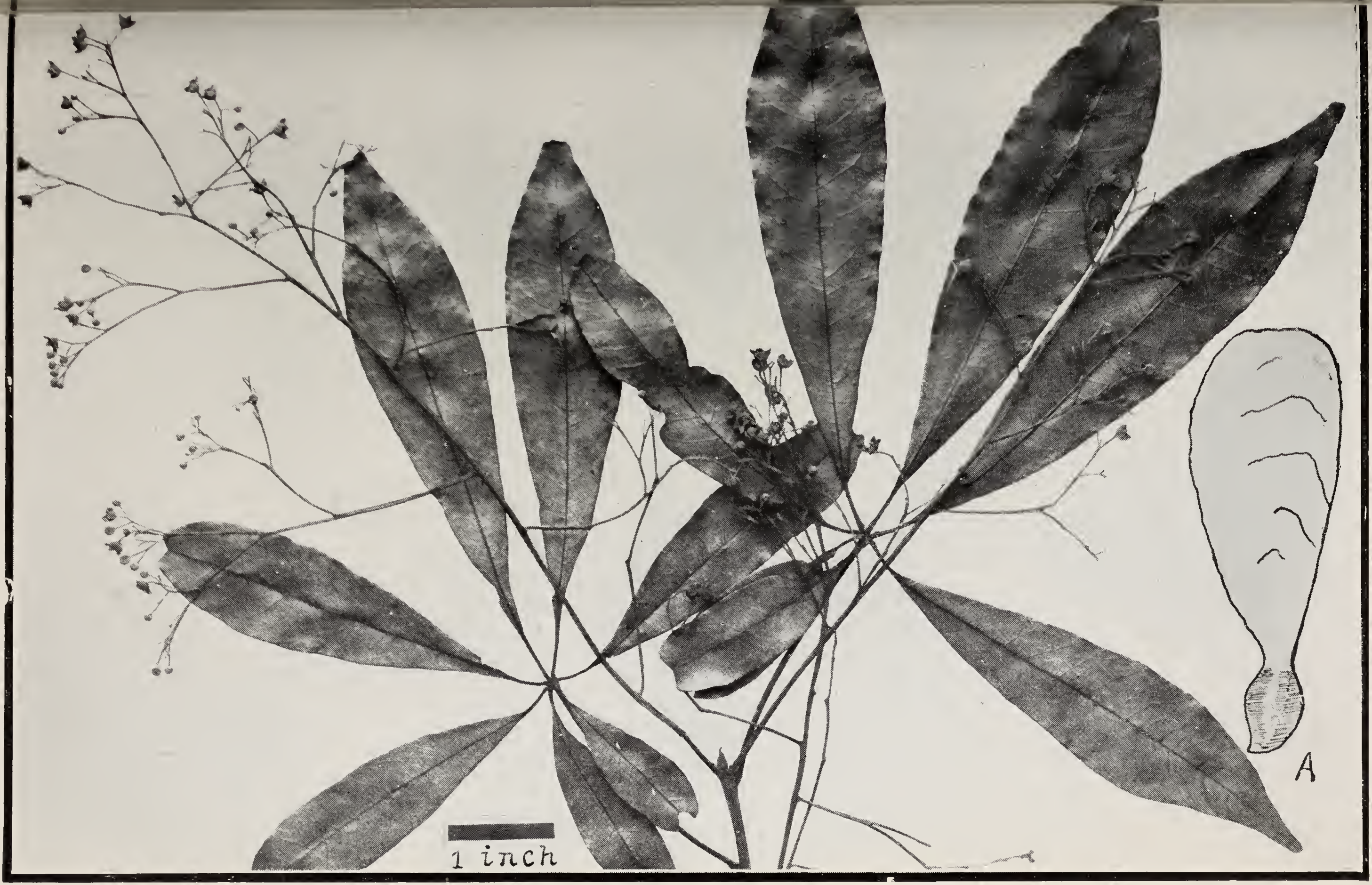


Fig. 178.—Black Jack (*Tarrietia actinophylla*). Inflorescence-bearing branchlet. A, carpel. A, natural size; remainder to inch scale. All in dry state. (*Photo.: Dept. Agric. and Stock, Brisbane.*)

5–10½ in. long, 1½–3½ in. broad. Cairns, Atherton district.—Var. 4, *trifoliolata* Bail. Leaflets 3, scurf often dark and coppery. Common in the scrubs North and South.—Var. 5, *peralata* Bail. Leaflets 4–7 in. long, carpels with a rough surface and furnished with a very large wing 2–4 in. long. This is the common variety of the Atherton Tableland.

The above descriptions of the varieties are abridged from F. M. Bailey's Queensland Flora, vol. 1, p. 140. It seems very doubtful if there are any definite differences between the normal form and variety *trifoliolata*. In both instances the number of leaflets varies from 3–2, and the colour of the scurfy covering is a variable feature. The Northern varieties are not very well known from a botanical viewpoint, although at least two of them are very common on Atherton Tableland.

Uses.—The timber is an ornamental one, the broad medullary rays giving it a Silky-Oak-like appearance. It often splits freely and on that account is frequently used by selectors for battens, shingles, &c. in their temporary buildings. One of its disadvantages is that wood borers readily attack it when the trees are felled. It should have a very wide use in case-making, especially as the trees are very plentiful in the subtropical scrubs, where they form long-stemmed, symmetrical trees of an ideal sawmilling type.

References.—*Tarrietia Argyrodendron* Bentham, Flora Australiensis, vol. i., p. 230, 1863; *Argyrodendron trifoliolatum* F.v.M., Fragmenta Phytographiae Australiae, vol. i., p. 2, 1858–1859.

Tarrietia actinophylla F.M.B. Black Jack, Blush Tulip Oak, Tulip Oak. Figs. 176, 177, 178.

Derivation.—Tarrietia is derived from the native Javanese name for the original species of the genus, *Tarrietia javanica;* actinophylla from Greek *aktis*, a ray; *phyllon*, a leaf.

Description.—A large tree attaining a height of about 140 ft. and a stem diameter of about 3½ ft. Stem buttressed at the base, the buttresses often prominent and broad. Bark grey or more frequently brown, dark brown, or almost black, mostly finely fissured and shed in small rectangular pieces; when cut it is pinkish brown towards the outer surface and nearly white towards the sapwood; measurement of bark, ⅜ in. thick on a tree with a stem diameter of 3 ft. The scurfy scales such as those covering the underside of the leaves of *Tarrietia Argyrodendron* are mostly absent from the leaves of this species, but are present on the inflorescence. Leaves alternate, consisting of 3–9 leaflets radiating from the top of the leaf-stalk. Common leaf-stalk slender, 2½–6 in. long on flowering branches. Stalklet of each leaflet about ½ in. long. Leaflets narrowly elliptical, gradually tapering at the base and often drawn out into a long point at the apex, nerves and net-veins visible on both surfaces; measurement of leaf-blade, 2½–6 in. long, 3¼ to over 4 times as long as broad. On barren shoots the leaf-stalks sometimes attain over 12 in. in length and the leaflets 10 in. in length. Flowers in much-branched inflorescences (panicles) sometimes longer than the leaves, proceeding from the forks of the leaves. Flower-stalks slender, clothed as well as the flowers by scurfy scales. Flowers, like those of *Tarrietia Argyrodendron*, measuring about ¼ in. in diameter and consisting of a broadly bell-shaped calyx with 5 triangular lobes at the rim. There are no petals in the flowers. Perfect male and female organs in separate flowers. On the inner side of the calyx and slightly shorter than it in the male flowers are the stamens, which are united into a column bearing a small round mass of 10 or more anthers at the summit. On the inner side of the calyx and slightly shorter than it in the female flowers are the 3–5 more or less distinct carpels, which taper at the apex into as many styles. When they mature, the carpels constitute the fruit, at which stage they are separate from each other and consist of a body containing a rounded seed at the base and extended into a flat thin wing towards the top as in *Tarrietia Argyrodendron*. The ripe carpels are 1½–2½ in. long including the wing which is ½–1 in. broad. Flowering period: April.

Distribution.—One of the most frequent species in the mountain scrubs south of Brisbane such as those of the Macpherson Range. It occurs to a more limited extent on the D'Aguilar and Blackall Ranges, and has been found in Southern Queensland as far north as the neighbourhood of Gympie. A species identical with this one or closely resembling it is also found on the Eungella Range, 45 miles westward of Mackay in latitude 21° S. N. S. Wales as far south as Gloucester (J. H. Maiden).

Uses.—The wood is similar in properties to the paler kinds of *Tarrietia Argyrodendron* and might be used for the same purposes. It is not durable in the weather.

Reference.—*Tarrietia actinophylla* F. M. Bailey, Synopsis of Queensland Flora, p. 37, 1883.

4. COMMERSONIA.

Commersonia echinata Forst. Brown Kurrajong. Up to 40 ft. high and 1 ft. stem diameter. Very common as shrub in second growth of felled scrub. Shrub has brown fibrous bark marked by spots (lenticels). Leaves alternate; stalks ⅜–¾ in.; blades egg-shaped or heart-shaped in outline, broad and sometimes indented and unequal-sided at base, margins mostly toothed, paler and finely hairy beneath, 3–6½ in. long, 1½–2 times as long as broad. Flowers about ¼ in. in diameter when expanded. The stamens, 5 in each flower, are minute, opposite each petal, and below 5 triangular staminodia which appear to surround the ovary. Capsule globose, ¾–1 in. in diameter including the ¼-in. long soft processes which cover it, 5-valved; seeds brown, egg-shaped, ⅒ in. long.—Clarence River (Benth.) to Cape York (Benth.). East Indies and Pacific Islands.

Family FLACOURTIACEAE.

Scolopia Brownii F.v.M. Shrub or small tree. Sometimes armed with thorns in forks of leaves. Leaves alternate; stalks ⅛–¼ in.; blades narrowed at both ends, often with 1 or 2 angles on the margin on each side, the basal pair of lateral nerves very oblique and parallel with margin of lower part of blade, 1½–3 in. long, 2–3 times as long as broad. Fruit globose, about ½ in. in diameter, containing a number of angular seeds ⅛–¼ in. in breadth imbedded in the pulp.—Illawarra (Benth.) to Cape York (Benth.). In some cases this species attains a large size. The following description is of a tree growing on Tambourine Mountain, South Queensland:—Height about 90 ft.; stem diameter about 1 ft. 8 in. Stem slightly buttressed. Bark brown, slightly scaly; when cut brownish yellow, ½ in. thick.

Family MYRTACEAE.

Leaves opposite or mostly opposite.
  Leaves with a prominent, curved, longitudinal nerve on each side of the midrib .. .. 1. *Rhodamnia.*
  Leaves with more or less parallel lateral nerves running from midrib towards leaf margins.
    Fruit succulent, indehiscent.
      Sepals and petals 5. Fruit mostly containing several seeds 2. *Myrtus.*
      Sepals and petals 5. Fruit containing numerous almost triangular seeds arranged in about 6 longitudinal rows 3. *Rhodomyrtus.*
      Sepals and petals mostly 4. Fruit mostly containing 1 seed 4. *Eugenia.*
    Fruit scarcely succulent and often splitting open.
      Sepals and petals mostly 5. Fruit surmounted by the 5 spreading, prominent calyx lobes .. .. .. 5. *Backhousia.*
      Sepals and petals 5 or 4. Fruit seated on calyx and splitting into 3 pieces .. .. 6. *Xanthostemon.*
      Sepals and petals 5 or 4. Flowers in dense globular heads; individual flowers closely appressed to each other .. 7. *Syncarpia.*
Leaves alternate or approximated in groups of 3–5. Leaves opposite in *Tristania neriifolia.* Sepals and petals mostly 5. Stamens united in 5 bundles, the bundles irregular in *Tristania neriifolia* .. .. 8. *Tristania.*

1. RHODAMNIA.

Rhodamnia trinervia Blume. Scrub Stringybark, Scrub Turpentine, Brown Malletwood. Figs. 179 and 180.

Derivation.—Rhodamnia from Greek *rhodamnos,* a young branch (probably refers to the slender branchlets of the first so named species); trinervia from Latin *tri,* three; *nervus,* a nerve (alluding to the three main nerves in the leaf).

Description.—A tree attaining a height of about 90 ft. and a stem diameter of 2 ft. 6 in. Often seen flowering as a shrub. Stem not prominently buttressed but often longitudinally channelled. Bark reddish brown, prominently fissured; when cut, reddish brown, composed of thin flakes. Measurement of bark ¼–½ in. thick on a tree with a stem diameter of 2 ft. 6 in. Sapwood yellow to brown. Branches and branchlets often clothed with a reddish bark. Young shoots, young branchlets, underside of leaves, and leaf-stalks downy. Leaf-stalks ⅙–⅓ in. long. Leaves opposite. Leaf-blade lance-shaped, elliptical or egg-shaped in outline, mostly protracted into a prominent point at the apex, the midrib and a curved longitudinal nerve on each side of it prominent on both surfaces, net-veins more conspicuous and hairy on the underside; measurement of leaf-blade, 2–4 in. long, 2–3 times as long as broad. Flowers in small inflorescences (panicled cymes) situated in the forks of the leaves or at the

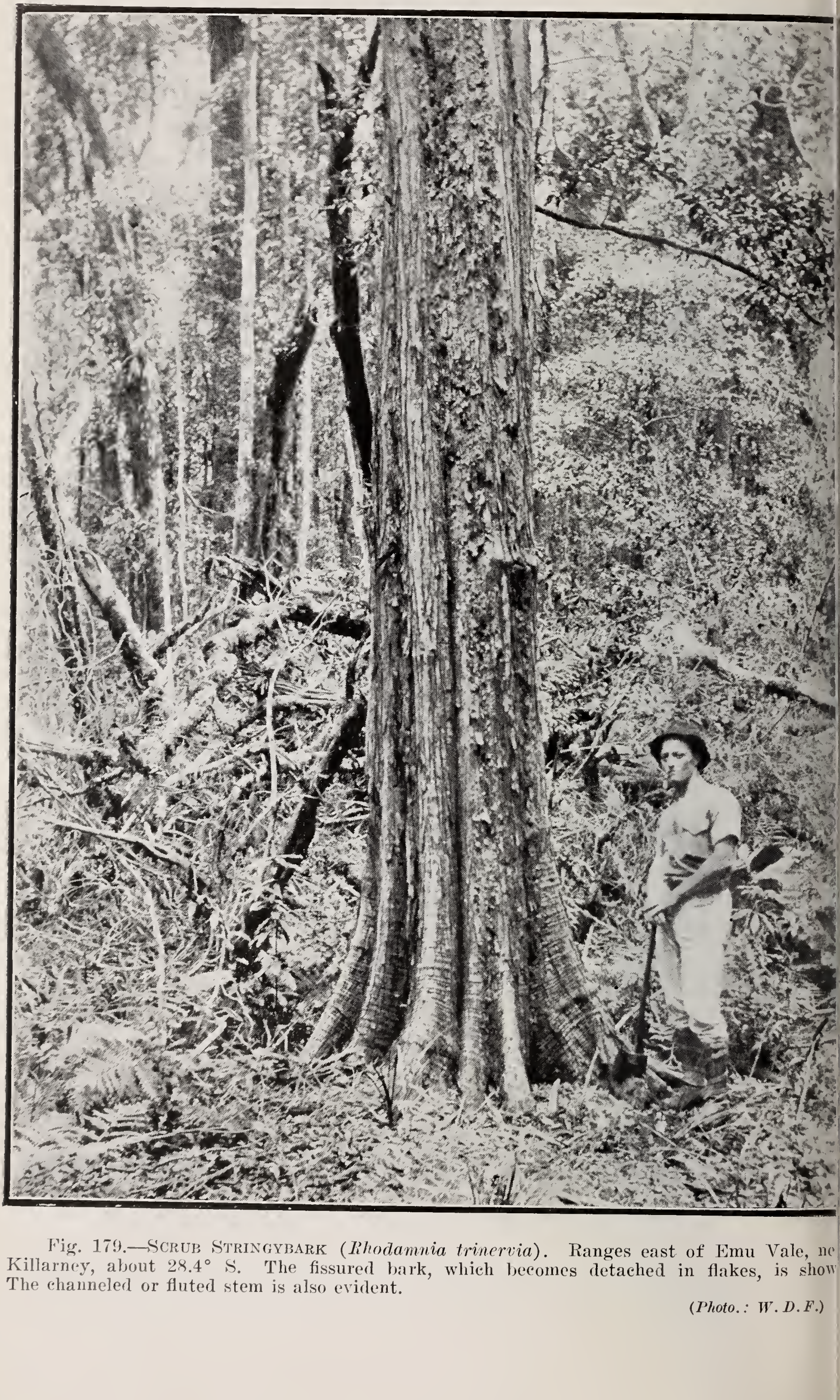
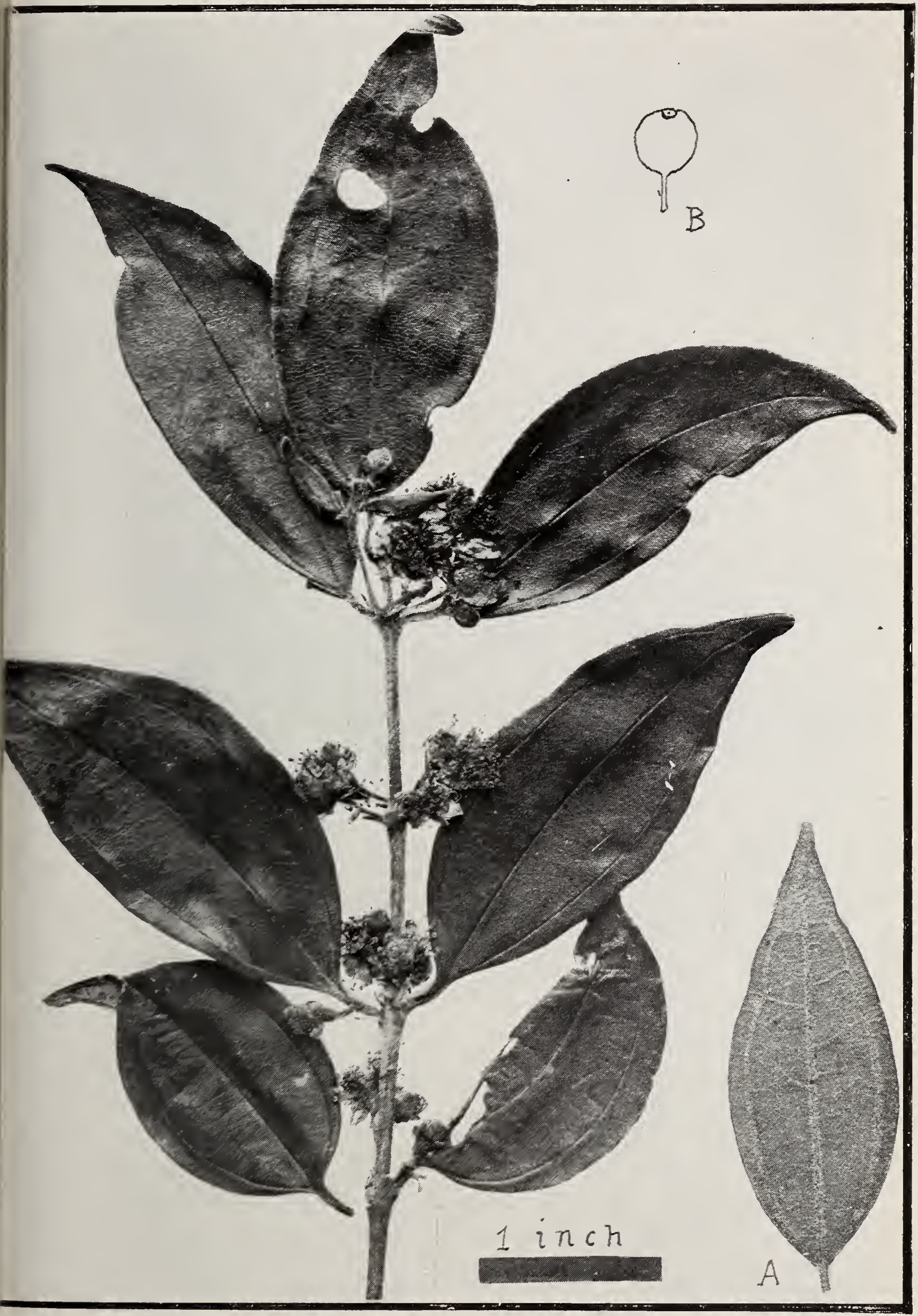


Fig. 179.—Scrub Stringybark (*Rhodamnia trinervia*). Ranges east of Emu Vale, ne Killarney, about 28.4° S. The fissured bark, which becomes detached in flakes, is show The channeled or fluted stem is also evident.

(*Photo.: W. D. F.*)



ig. 180.—SCRUB STRINGYBARK (*Rhodamnia trinervia*). Inflorescence-bearing branchlet. A, leaf showing underside; B, outline of fruit. All to inch scale. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

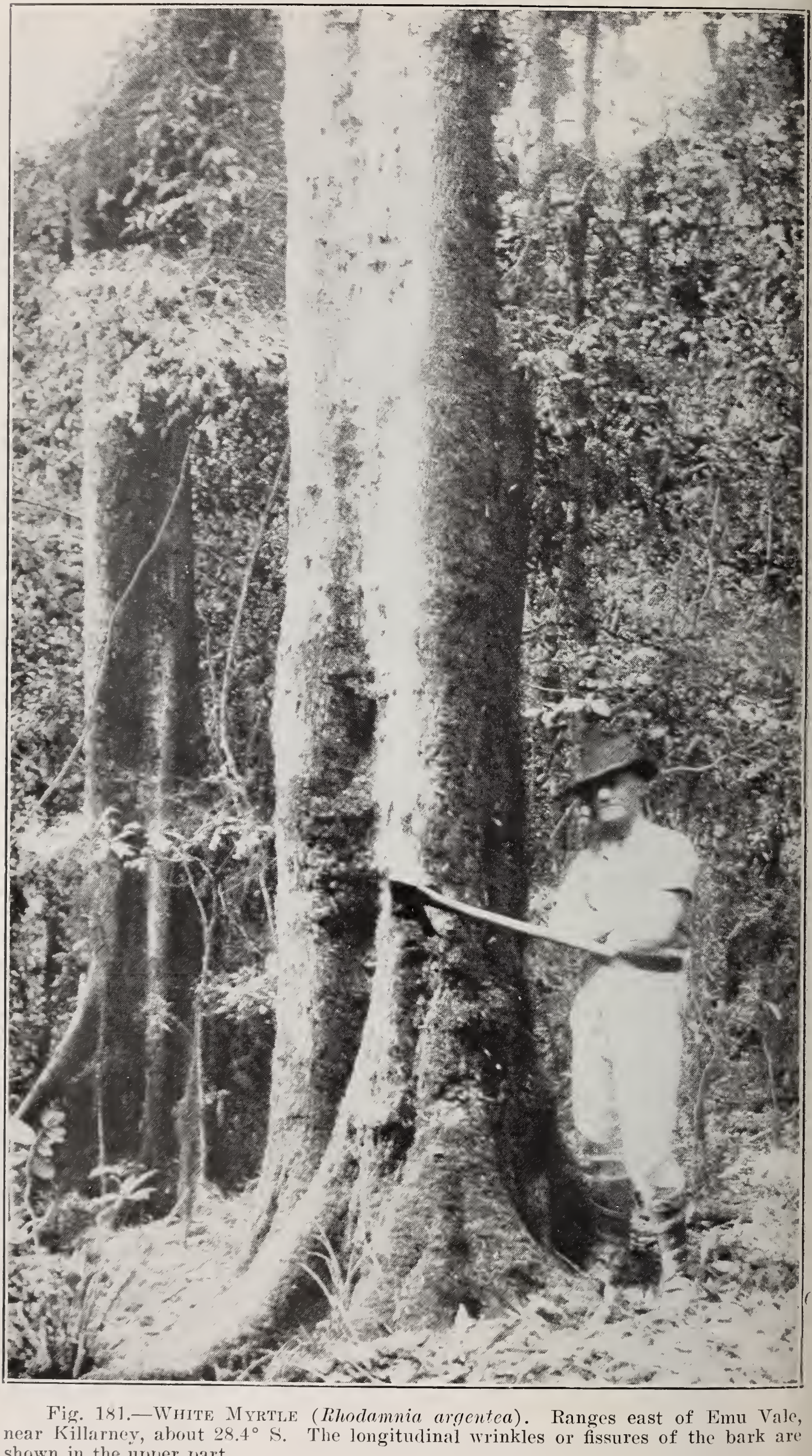


Fig. 181.—White Myrtle (*Rhodamnia argentea*). Ranges east of Emu Vale, near Killarney, about 28.4° S. The longitudinal wrinkles or fissures of the bark are shown in the upper part.

(*Photo.: W. D. F.*)

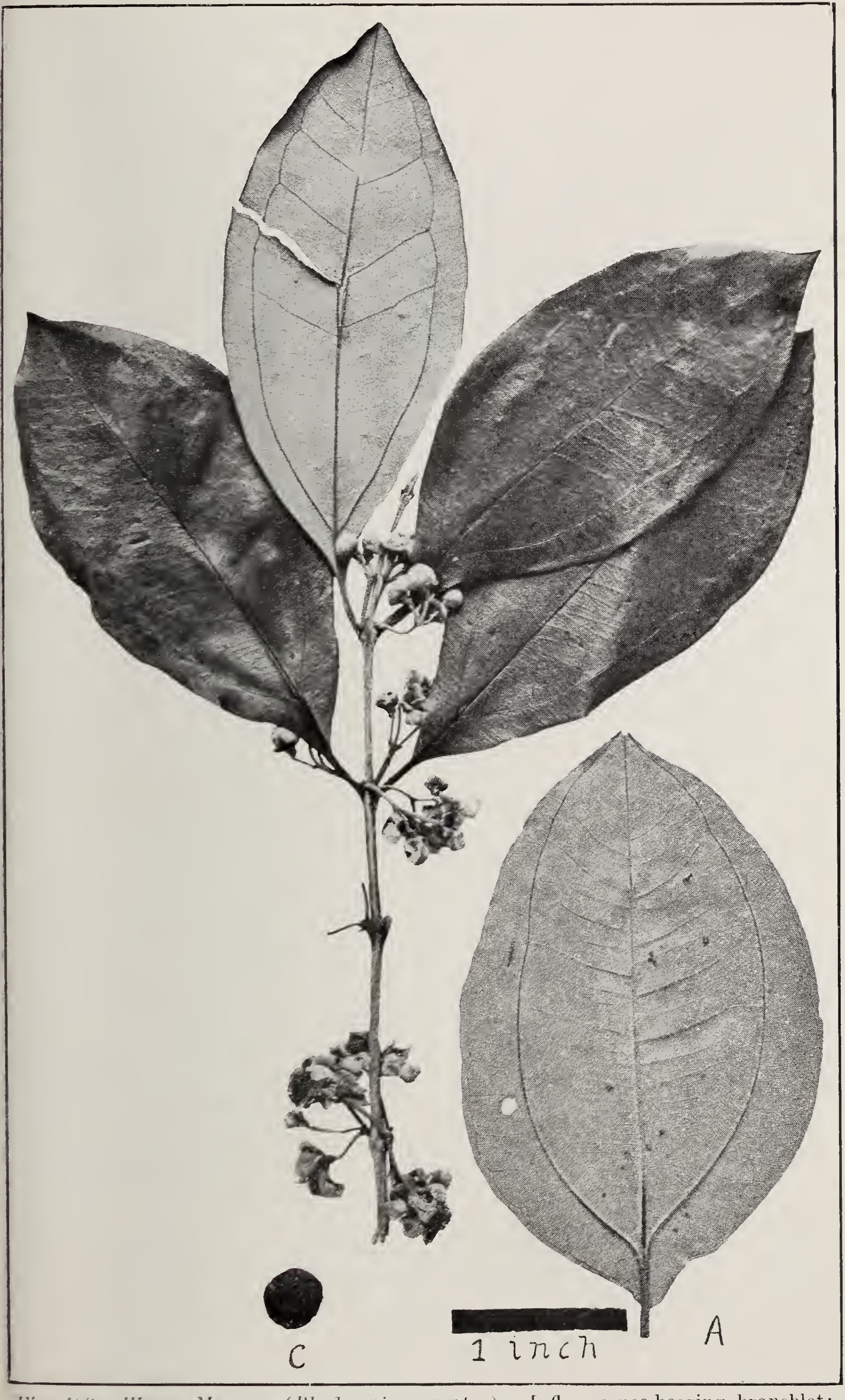


Fig. 182.—White Myrtle (*Rhodamnia argentea*). Inflorescence-bearing branchlet; A, leaf showing underside; C, fruit. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

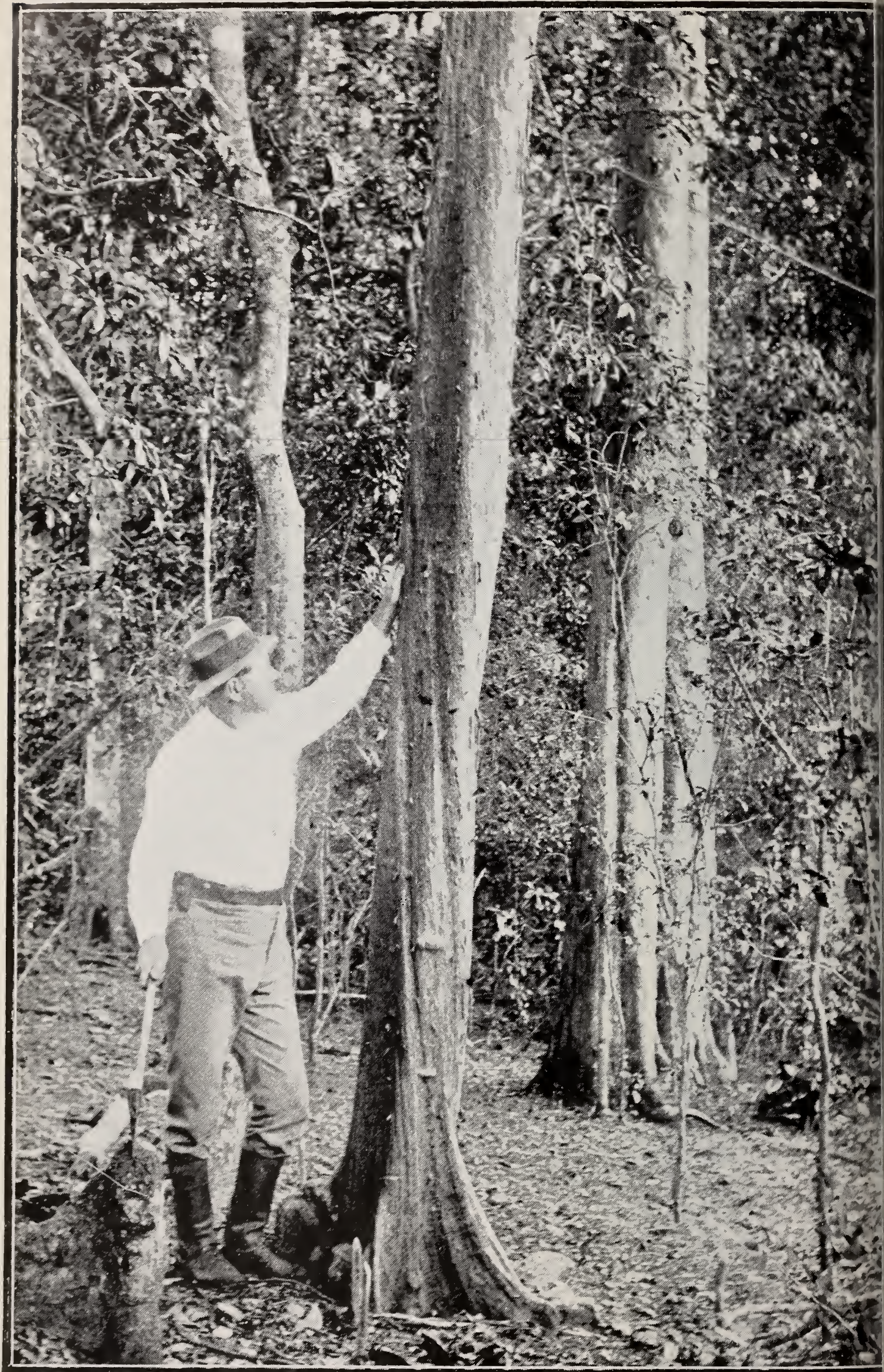
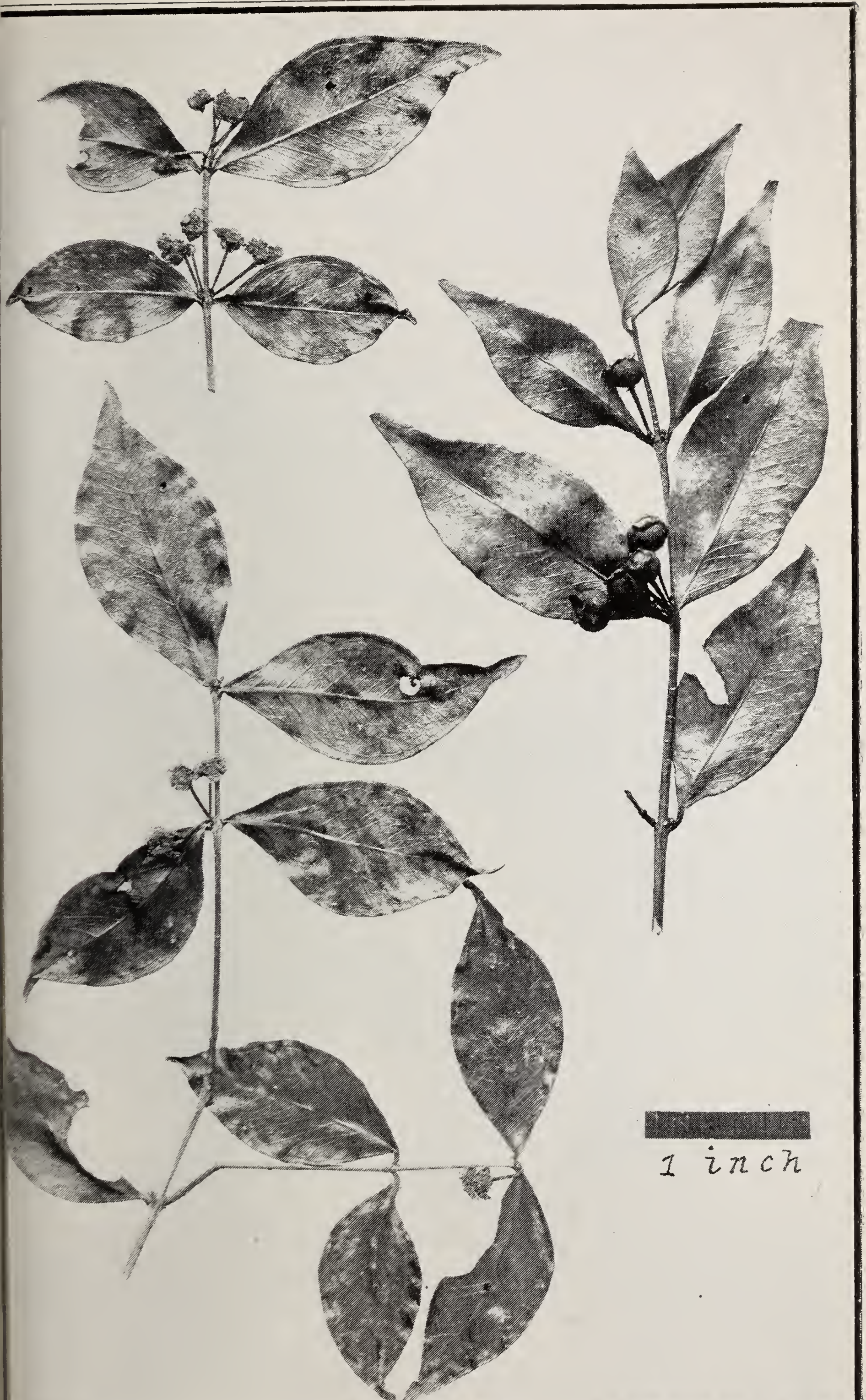


Fig. 183.—Scrub Ironwood (*Myrtus Hillii ?*) Imbil, about 26.4° S. The smooth bark and the thin, small pieces of partly shed bark are shown. (*Photo.: W. D. F.*)



g. 184.—Scrub Ironwood (*Myrtus Hillii ?*). Inflorescence-bearing branchlets on left; fruit-bearing branchlet on right. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

scars of fallen leaves, the inflorescences generally much shorter than the leaves. Individual flowers sometimes stalkless but more frequently on slender stalks. Flowers about ⅓ in. in diameter when expanded; the outermost part, the calyx, about $\frac{3}{16}$ in. in diameter, consisting of a small bell-shaped tube bearing 4 small lobes at its rim. Alternating with the calyx lobes are 4 white broadly oval or nearly round petals about ⅙ in. long. On the inner side of the petals are numerous (over 20) bristle-like stamens about ⅛ in. long. The ovary (in the centre of the flower) is united with and fills the inside of the calyx tube; it bears at its summit a slender style about ⅙ in. long. Fruit a small berry about ¼ in. in diameter, crowned by the remains of the 4 calyx lobes, the outer fleshy part enclosing 2 or more seeds. Flowering period: September and October.

Distribution.—Illawarra, N.S.W. (C. Moore), to Gympie, Queensland.

Uses.—The timber should be useful for general building and indoor work.

Reference.—*Rhodamnia trinervia* Blume, Museum Botanicum Lugduno-Batavum, vol. i., p. 79, 1849–1851.

Varieties.—Var. *glabra* Maiden & Betche differs from the normal form in the absence of hairs on the branchlets, undersides of leaves, leaf-stalks, and flowers. Distribution: Northern Rivers of N. S. Wales and Macpherson Range, Queensland.—Var. *spongiosa* (F. M. Bailey) differs from the normal form in the absence of hairs on the branchlets, undersides of leaves, and leaf-stalks. When the reddish loose bark is shed from the branchlets a whitish almost spongy coating is exposed. Distribution: Tringilburra Creek near Cairns, Barron River.

Rhodamnia argentea Benth. White Myrtle, Brown Malletwood. Figs. 181 and 182.

Derivation.—Rhodamnia from Greek *rhodamnos*, a young branch (probably alluding to the slender branchlets of the first species so named); Latin *argentea*, silvery (referring to the silvery under-surface of the leaves).

Description.—A tree attaining a height of 100 ft. and a stem diameter of nearly 3 ft. Stem often channelled and slightly flanged at the base but not prominently buttressed. Bark reddish brown or grey, finely fissured; often flaky in the channels of the stem; when cut, dark brown, varying from ⅛–¼ in. thick on a tree with a stem diameter of 2 ft. 9 in. Sapwood pale brown to yellow. Young shoots and underside of leaves covered by a more or less dense, white, silvery, powder-like fluff. Leaf-stalks ⅙–⅓ in. long. Leaves opposite, egg-shaped, lance-shaped, or elliptical in outline, tapering or sometimes nearly rounded at the base, blunt or protracted into a long point at the apex, the midrib and a curved lateral nerve on each side of it prominent on both surfaces; the nerves diverging from the midrib and the net-veins are more conspicuous on the under-surface. Measurement of leaf-blade 2–3½ in. long, 2–3 times as long as broad. Flowers in small inflorescences (cymes) in the forks of the leaves, 2–4 stalks springing from each fork; each stalk measures from ¼–½ in. long and bears 3 flowers, the central one of which is sometimes without a stalklet, whilst the flower on each side has a stalklet about ⅛ in. long. The lowermost part of the flower (the calyx) is about $\frac{3}{16}$ in. in diameter; its lower part is cup-shaped, and its upper part divided into 4 oval lobes about $\frac{1}{10}$ in. long. Alternating with the calyx lobes are 4 white, broadly oval petals about ⅕ in. long. On the inner side of the petals are numerous (over 20) bristle-like stamens about ⅙ in. long. The ovary fills the cup-shaped part of the calyx, with which it is united, and tapers into a slender style about ¼ in. long. Fruit globular, black, about ⅓ in. in diameter, the outer fleshy part enclosing 1, 2, or more hard, smooth, yellowish seeds. Flowering period irregular.

Distribution.—Coastal scrubs of Eastern Australia from the Clarence River, N.S.W. (Bentham), to Baffle Creek, north of Bundaberg, Queensland.

Uses.—The timber should be useful for general building purposes.

Reference.—*Rhodamnia argentea* Bentham, Flora Australiensis, vol. 3, p. 278, 1866.

2. MYRTUS.

Myrtus Hillii Benth. (?) Scrub Ironwood, Ironwood. Figs. 183 and 184.

Derivation.—Myrtus from Greek *myrtos*, the myrtle; Hillii after Walter Hill.

Description.—A small tree attaining about 60 ft. in height and a stem diameter of about 1 ft., but frequently much smaller. Stem often irregular, frequently angular in cross-section, sometimes with small flanges at the base. Bark very smooth, bright green with patches of brown, shed in narrow twisted flakes; when cut, bright green, paler inwards, measuring $\frac{1}{16}$ in. thick on a tree with a stem diameter of 10 in. All parts of the tree are hairless with the exception of the flowers. Leaf-stalks $\frac{1}{12}$–⅙ in. long.

Leaves opposite, egg-shaped or elliptical in outline, drawn out into a blunt point at the apex, upper surface glossy, midrib and lateral nerves visible on both surfaces; measurement of leaf-blade, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $1\frac{3}{4}$–$2\frac{1}{3}$ times as long as broad. Flowers in groups of 2 or more (rarely solitary) in the forks of the upper leaves, the groups sometimes on short stalks. Each flower is borne on a slender stalklet $\frac{1}{4}$–$\frac{1}{2}$ in. long and measures about $\frac{3}{8}$ in. in diameter when expanded. The lowermost part of the flower consists of the calyx, which is composed of a lower cup-shaped part about $\frac{1}{12}$ in. long surmounted by 5 broad rounded or nearly triangular lobes about $\frac{1}{12}$ in. long. On the inner side of the calyx lobes and alternating with them are 5 cream-coloured elliptical or almost circular petals each measuring about $\frac{1}{6}$ in. in length. On the inner side of the petals are numerous (over 20) slender stamens about $\frac{1}{4}$ in. long. The ovary fills the inside of the lower part of the calyx, is surmounted by a slender style about $\frac{1}{5}$ in. long, and is divided into 2 cells, each cell containing numerous ovules. In some specimens the calyx, petals, and the summit of the ovary are finely hairy. Fruit nearly globular, about $\frac{1}{4}$ in. in diameter, crowned by the 5 persistent calyx lobes and containing 3–5 smooth seeds which are rounded on the back and flattened on their inner faces and measure about $\frac{1}{6}$ in. in length. Flowering period: November.

Distribution.—Scrubs of Eastern Queensland from the Brisbane River on the south extending westward as far as the Bunya Mountains (about 100 miles inland). J. F. Bailey records it from as far north as the Herberton district (Q'land Agricultural Journal, vol. 5, 398, 1899). Confined to Queensland.

Uses.—The timber, which warps in drying, is not used extensively.

Reference.—*Myrtus Hillii* Bentham, Flora Australiensis, vol. iii., p. 275, 1866.

Myrtus rhytisperma F.v.M. Shrub or small tree. Young branchlets finely hairy. Leaves opposite; stalks $\frac{1}{12}$–$\frac{1}{8}$ in.; blades egg-shaped or elliptical in outline, venation not prominent, apex blunt, 1–$1\frac{1}{2}$ in. long, 2–3 times as long as broad. Flowers single in leaf-forks (axils), on slender stalks about 1 in. long. Fruit fleshy, purple, $\frac{3}{8}$–$\frac{1}{2}$ in. in diameter. Seeds several in each fruit, angular, about $\frac{1}{5}$ in. broad. (Var. *grandifolia* Benth., leaves up to $2\frac{1}{2}$ in. long with a bluntly pointed apex.)—Clarence River (Benth.) to Gympie.

In addition to the foregoing the following species have been described:—*Myrtus gonoclada* F.v.M., *M. Becklerii* F.v.M., *M. Bidwilli* Benth., *M. acmenioides* F.v.M., and *M. fragrantissima* F.v.M. At present it would not be practicable to describe all of these species accurately without access to the types. Perhaps the Eastern Australian species could be revised with advantage. Bentham (Fl. Aust. 3, 274) states that there is no positive character to separate *Myrtus* from *Eugenia* except the embryo, and the 1-flowered species of the two genera are not very dissimilar in foliage. He further remarks that generally speaking the Myrtles have smaller leaves, a more simple inflorescence, and more generally 5-merous flowers than the Eugenias of the Old World. So far as the writer is aware the Myrtles of Eastern Australia are shrubs or small trees.

3. RHODOMYRTUS.

Rhodomyrtus psidioides Benth. Attaining a height of 40 ft. Leaves opposite; stalks $\frac{1}{2}$–$\frac{3}{4}$ in.; blades $2\frac{3}{4}$–6 in. long, 2–3 times as long as broad, drawn out into a short or long blunt point at apex, venation fairly prominent on both sides. Fruit globose or egg-shaped, fleshy, about $\frac{1}{2}$ in. in diameter, bearing near apex 5 triangular calyx lobes $\frac{1}{8}$–$\frac{1}{4}$ in. long. Seeds numerous in each fruit, almost triangular, $\frac{1}{8}$ in. broad, arranged in about 6 longitudinal rows.—Hunter River (Benth.) to Gympie.

4. EUGENIA.

Eugenia Smithii Poir. Lillipilli. Fig. 185.

Derivation.—Eugenia, in honour of Prince Eugene of Savoy; Smithii, after Sir J. E. Smith.

Description.—A tree attaining a height of about 60 ft. and a stem diameter of about 1 ft. Stem not prominently buttressed. Bark brown, somewhat scaly, brown or reddish brown when cut and measuring about $\frac{1}{2}$ in. thick on a tree with a stem diameter of 9 in. All parts hairless. Leaf-stalks $\frac{1}{10}$–$\frac{1}{4}$ in. long. Leaves opposite, lance-shaped, drawn out into a point at the apex, gradually narrowed at the base, midrib and lateral nerves visible on both surfaces; measurement of leaf-blade, $1\frac{1}{2}$–3 in. long, 2–4 times as long as broad. Flowers in inflorescences (panicles) at the ends of the branchlets and sometimes in the forks of the upper leaves, the inflorescences occasionally longer than the leaves. The lowermost part of the flower, the calyx, is funnel-shaped, measuring about $\frac{1}{4}$ in. long and about $\frac{1}{8}$ in. in diameter at the upper expanded part, the rim entire or obscurely 4-lobed. On the inner side of the calyx rim are the 4 small, round, cream-coloured petals each measuring about $\frac{1}{20}$ in. in diameter; they overlap one another and fall away together as the flower expands. The stamens, which are situated next to the petals, are very fine and bristle-like, exceed 25 in number, and measure about $\frac{1}{12}$ in. long; the anthers are remarkable on account of their 2 cells being distinct, globular or egg-shaped and horizontal or diverging from one another. The ovary fills the narrow lower part of the calyx and is surmounted by a style about $\frac{1}{16}$ in. long. Fruit globular, white or purplish, measuring from $\frac{1}{3}$ to over $\frac{1}{2}$ in. in diameter, crowned by the circular rim of the calyx, containing a single large seed, surrounded by a coating of succulent pulp. Flowering period: November and December.

Distribution.—Coastal districts of Victoria, N. S. Wales, and Queensland as far north as Cape York Peninsula and as far west as Port Essington in North Australia (Bentham).

Uses.—The timber should be suitable for general indoor purposes. The fruits, which have a pleasant taste, are sometimes eaten.

Reference.—*Eugenia Smithii* Poiret, Encyclopedie Methodique Suppl. iii., p. 126.

Eugenia hemilampra F.v.M. Attains 100 ft. in height and 3 ft. stem diameter, but often much smaller. Stem with buttressed roots. Bark brown or reddish brown, shed in flakes, when cut reddish brown, $\frac{3}{8}$ in. thick on a tree 3 ft. stem diameter. Leaves opposite, stalks $\frac{1}{10}$–$\frac{1}{5}$ in.; blades 2½–4 in. long, 2–3 times as long as broad. Flowers and fruits very similar to those of *Eugenia Smithii* (*see* Fig. 185). It is often very difficult to distinguish this species from *E. Smithii*, of which it may be a variety. The leaves are mostly larger than those of *E. Smithii*.—Clarence River to Cape York (F.v.M.).

Eugenia Ventenatii Benth. Weeping Myrtle. Figs. 186 and 187.

Derivation.—Eugenia after Prince Eugene of Savoy; Ventenatii after E. P. Ventenat.

Description.—A tree attaining a height of about 100 ft. and a stem diameter of about 2 ft. 6 in., but often much smaller, with a low, dense, round head of foliage. Stems frequently leaning over watercourses. Stem sometimes flanged a little at the base. Bark grey or dark grey, prominently furrowed or fissured. Leaf-stalks $\frac{1}{8}$–$\frac{1}{4}$ in. long. Leaves opposite, narrowly elliptical, drawn out into a long point at the apex, upper surface dark green and glossy; leaf-blade measurement, 2½–5 in. long, about 4 times as long as broad. Flowers in inflorescences (panicles) at the ends of branchlets or in the forks of the upper leaves, the panicles sometimes longer than the leaves. Stalks of individual flowers $\frac{1}{10}$ in., more or less, long. Individual flowers about $\frac{1}{3}$ in. long or about $\frac{1}{2}$ in. in diameter when expanded. The lowermost part of the flower is the calyx, which is bell-shaped and about $\frac{1}{6}$ in. long and without apparent lobes at the top. On the inner side of the rim of the calyx are 4 white or yellow round petals about $\frac{1}{12}$ in. in diameter; the petals soon fall away. On the inner side of the petals are the numerous (over 30) fine bristle-like stamens about $\frac{1}{4}$ in. long. The ovary is enclosed in and united with the calyx and is surmounted by a bristle-like style about as long as the stamens. Fruit nearly globular, crowned by the rim of the calyx, about $\frac{1}{2}$ in. in diameter, with a fleshy outer part enclosing a single large seed. Flowering period: November.

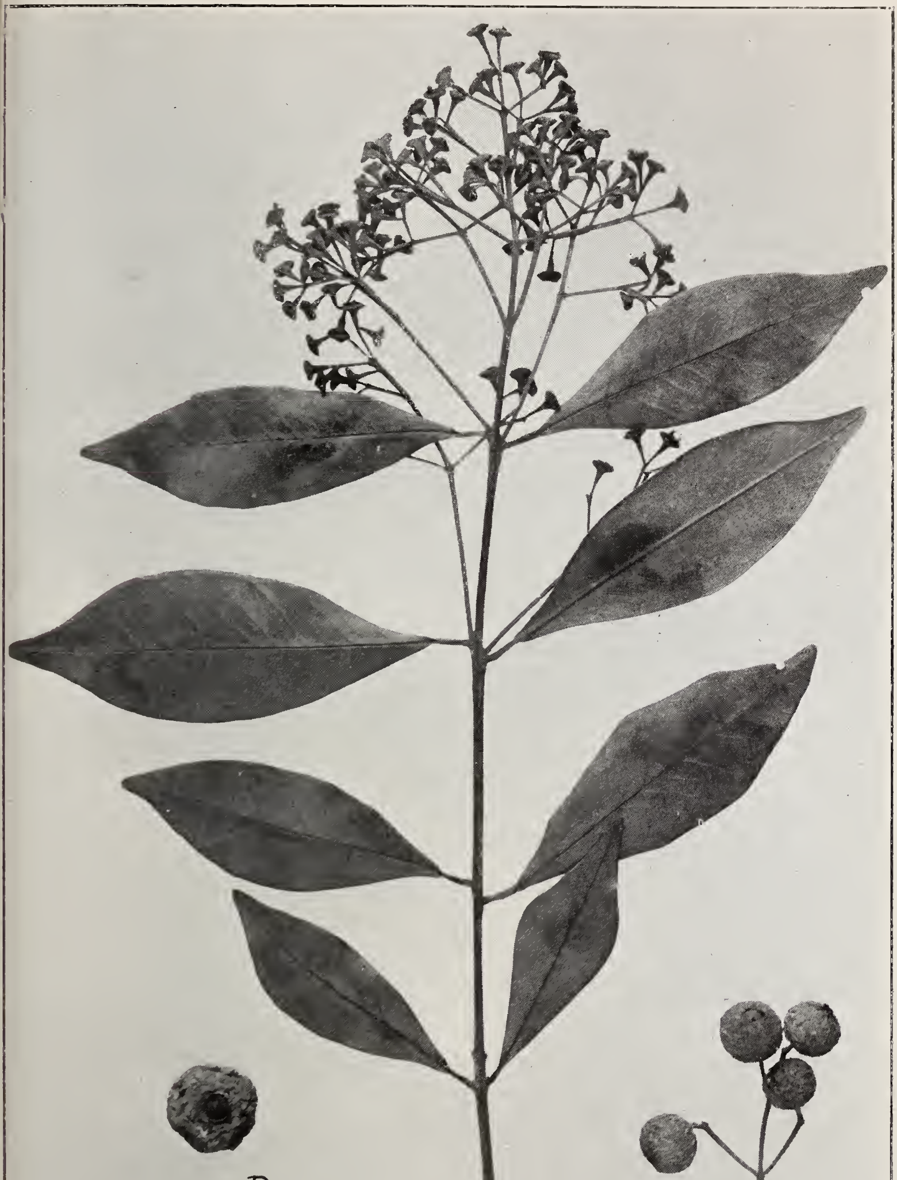
Distribution.—A very common tree overhanging freshwater streams in the lighter classes of scrub. Bentham records the species from as far north as Rockingham Bay, North Queensland, and Moore and Betche (Handbook of the Flora of N. S. Wales, 207, 1893) state that it occurs as far south as the Hastings River, N.S.W.

Reference.—*Eugenia Ventenatii* Bentham, Flora Australiensis, vol. 3, p. 283, 1866.

Eugenia Francisii F.M.B. Giant Water Gum, Rose Satinash. Figs. 188, 189, 190.

Derivation.—Eugenia, in honour of Prince Eugene of Savoy, an early protector and encourager of botany; Francisii, after W. D. Francis.

Description.—A very large tree attaining 140 ft. in height and a stem diameter of 5 ft. Stem mostly very widely and prominently buttressed at the base. Bark brown or grey, smooth or with occasional partly detached fairly long flakes; when cut, brown, measuring $\frac{3}{8}$ in. thick on a tree with a stem diameter of 3 ft. 6 in. Sapwood white. Leaf-stalks about $\frac{1}{4}$ in. long. Leaves opposite, somewhat egg-shaped or elliptical in outline, drawn out into a prominent point at the apex, upper surface dark green and glossy, underside paler, midrib and the numerous fine lateral nerves visible on both surfaces; measurement of leaf-blade, 1½–3 in. long, 2–2½ times as long as broad. Minute transparent dots (oil-cells), which are usually seen in the leaves of *Eugenias* and other Myrtaceae, are sometimes obscure in this species. Flowers in panicles at the ends of the branchlets and proceeding from the forks of the leaves. Stem and branches of panicles slender and often 4-angled. The flowers are borne at the end of the panicle branches in little clusters of 3–6. The individual flowers are very small, measuring less than $\frac{1}{4}$ in. long and are borne on a slender stalk $\frac{1}{12}$–$\frac{1}{10}$ in. The calyx tube, which forms the lowermost part of the flower, is bell-shaped and bears 4 short broad teeth at its rim. Within



g. 185.—LILLIPILLI (*Eugenia Smithii*). A, inflorescence-bearing branchlet (the petals and stamens in most cases have fallen away); B, fruit. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

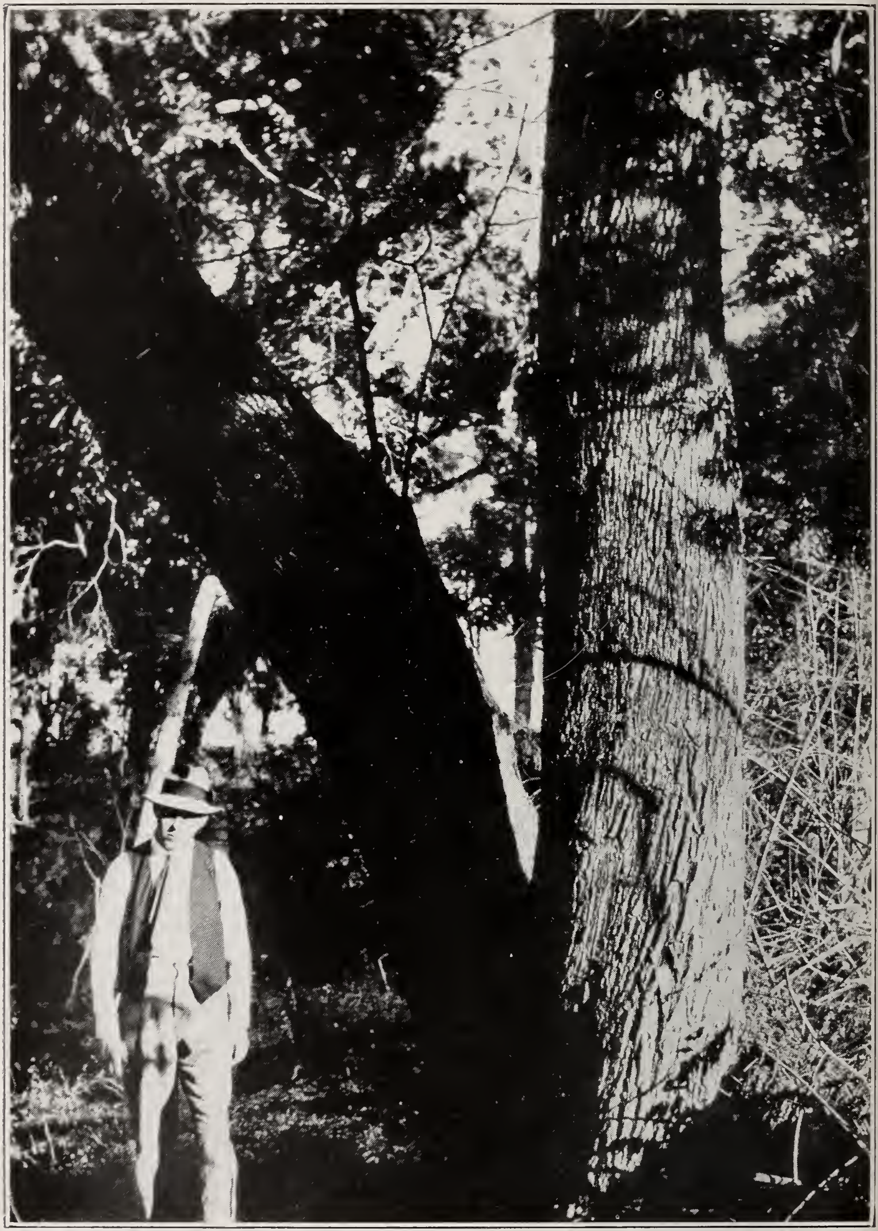


Fig. 186.—Weeping Myrtle (*Eugenia Ventenatii*). Enoggera Creek, Brisbane, abo 27.3° S. The two large stems are of this species. The fissured bark, common on large sten is shown on the stem on right. The stem on left overhangs the watercourse.

(*Photo.: W. D. F.*)

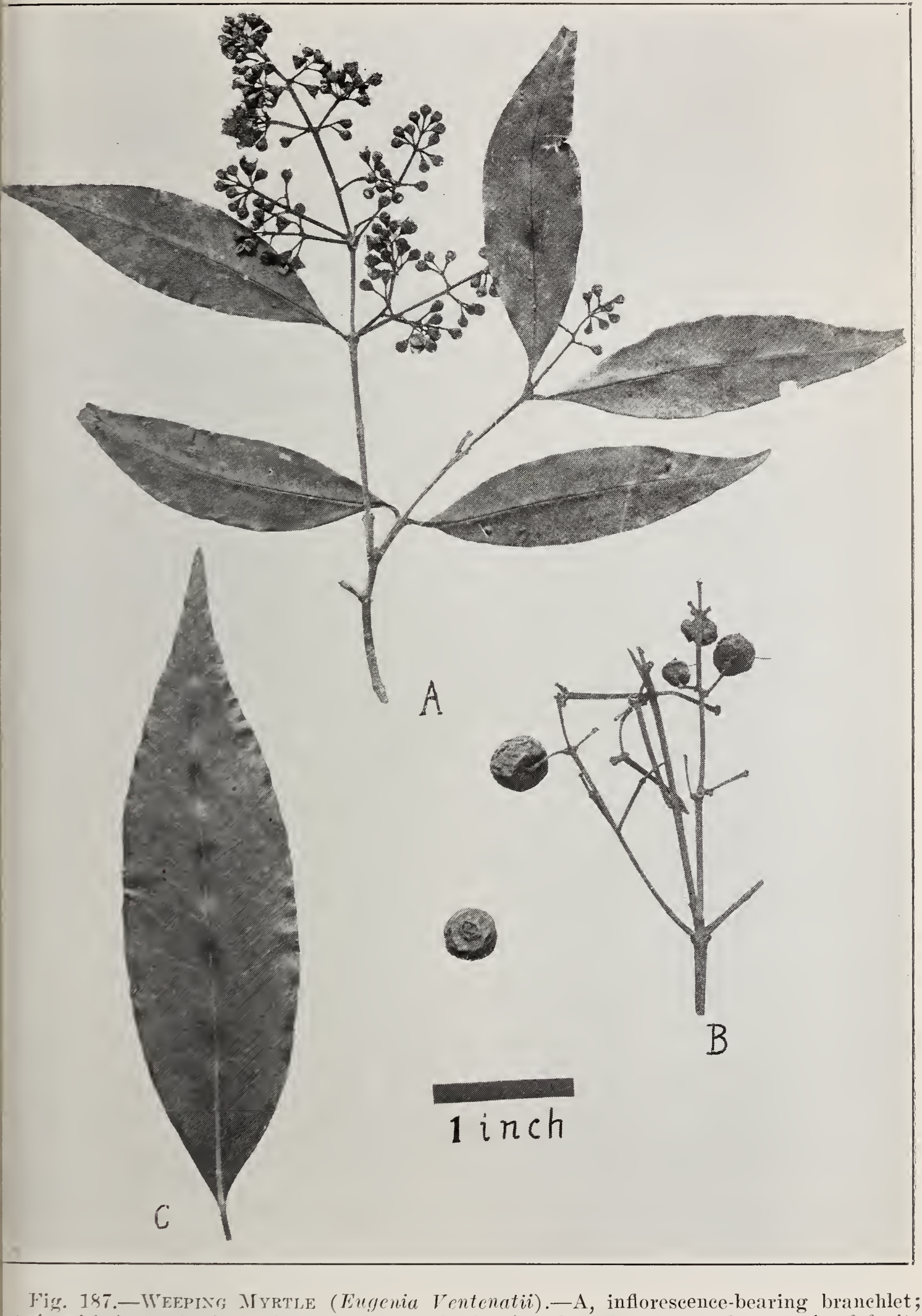


Fig. 187.—Weeping Myrtle (*Eugenia Ventenatii*).—A, inflorescence-bearing branchlet; , twig with fruit, the fruit above the inch scale showing the calyx rim on the summit of fruit; leaf showing underside. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

the calyx teeth the petals form a cup-shaped cap about $\frac{1}{10}$ in. in diameter. Within the ring of petals are numerous fine stamens about $\frac{1}{6}$ in. long. The ovary fills the lower part of the calyx tube and is surmounted by a style about as long as the stamens. Fruit bluish purple, often paler, round and somewhat flattened, nearly $\frac{1}{2}$ in. in diameter and $\frac{1}{4}$ in. in depth, consisting of a mealy pulp surrounding a comparatively large seed. Flowering period: November and December.

Distribution.—Coastal scrubs of Eastern Australia from the Richmond River, N.S.W., to Gympie, Queensland. It is a very common tree in the scrubs eastward of Gympie, and is frequent along watercourses and on damp flats.

Uses.—The close-grained pinkish timber has not been used so far as we know. It is easily worked, and could at least be used for cases.

Remarks.—The name "Water Gum" originated from the fact that quantities of a watery sap are sometimes contained in a central cavity or pipe of the stem, and it flows out when the trees are being felled. It is called "Giant Water Gum" to distinguish it from other smaller and hard-wooded trees, also known as "Water Gums" in Queensland.

References.—*Eugenia Francisii* F. M. Bailey, Queensland Agricultural Journal, vol. 26, p. 315, pl. 31, 1911. Mr. C. T. White and the author are unable to separate this species from *Eugenia Tomlinsii* Maiden and Betche, Proceedings of the Linnean Society of N. S. Wales, vol. 38, p. 247, 1913, and this view is taken in giving the distribution of the tree.

Eugenia corynantha F.v.M. Sour Cherry. Figs. 191 and 192.

Derivation.—Eugenia in honour of Prince Eugene of Savoy; corynantha, from Greek *koryne*, a club; *anthos*, a flower (alluding to the club-shaped flower-buds).

Description.—A tree attaining a height of 100 ft. and a stem diameter of about 3 ft. Stem somewhat flanged at the base. Bark grey, somewhat scaly and often finely and closely wrinkled longitudinally; when cut, outer part very pale brown, inner part brown and becoming almost pink at surface of sapwood. The bark measures $\frac{3}{8}$–$\frac{1}{2}$ in. thick on a tree with a stem diameter of 1 ft. 6 in. Sapwood almost white. All parts hairless. Leaf-stalks about $\frac{1}{8}$ in. long. Leaves opposite, elliptical, rounded, obtuse, or drawn out into a blunt point at the apex, gradually narrowed towards the base into the stalk, midrib and lateral nerves visible on the upper surface but more conspicuous on the underside; measurement of leaf-blade, 2–3½ in. long, 2–3 times as long as broad. Flowers in small inflorescences (short dense panicles) of 2–10 at the ends of the branchlets or in the forks of the leaves, the inflorescences about half the length of the leaves or less. The lowermost part of the flower, the calyx, is club-shaped or narrowly funnel-shaped, measures about $\frac{1}{2}$ in. long, and bears 4 broad lobes about $\frac{1}{8}$ in. long at its rim. On the inner side of and alternating with the calyx lobes are 4 round cream-coloured petals about $\frac{1}{4}$ in. in diameter. On the inner side of the petals are numerous (over 25) very fine stamens measuring $\frac{1}{2}$ in. or more in length. The ovary fills the narrow lower part of the calyx and is surmounted by a slender style over $\frac{1}{2}$ in. long. Fruit red when ripe, about $\frac{5}{8}$ in. long, very acid to the taste, apex broader than the base, crowned by the 4 persistent calyx lobes which surround a central cavity of the summit. Seed solitary in each fruit. Flowering period: June.

Distribution.—Coastal scrubs of N. S. Wales and Queensland from Port Macquarie, N.S.W. (F. v. Mueller) to Gympie, Queensland.

Uses.—The wood splits well and has been used by the settlers for the rough buildings they construct in the early stages of settlement.

References.—*Eugenia corynantha* F.v.M., Fragmenta Phytographiae Australiae, vol. 9, p. 144, 1875; *Eugenia punctulata* F. M. Bailey, Botany Bulletin No. 13, p. 10, 1896.

Eugenia Moorei F.v.M. Robby, Durobby.

Derivation.—Eugenia in honour of Prince Eugene of Savoy; Moorei after Charles Moore.

Description.—F. v. Mueller, who originally named the species, describes it as a tree attaining 80 ft. in height. All parts hairless. Leaf-stalks $\frac{1}{8}$–$\frac{3}{8}$ in. long. Leaves opposite, large, elliptical or lance-shaped, rounded, obtuse, or sometimes drawn out into a short blunt point at the apex, gradually tapering towards the base, midrib and lateral nerves visible on both surfaces; measurement of leaf-blade, 3½–9 in. long, 2–3 times as long as broad. Flowers in dense inflorescences (panicles) springing from the old branches below the leaves. Stalklets of the flowers about $\frac{1}{8}$ in. long. The lowermost part of the flower, the calyx, is bell-shaped, about $\frac{1}{5}$ in. long, the rim with 4 rounded thin lobes much broader than long. On the inner side of the calyx lobes are the 4 petals.

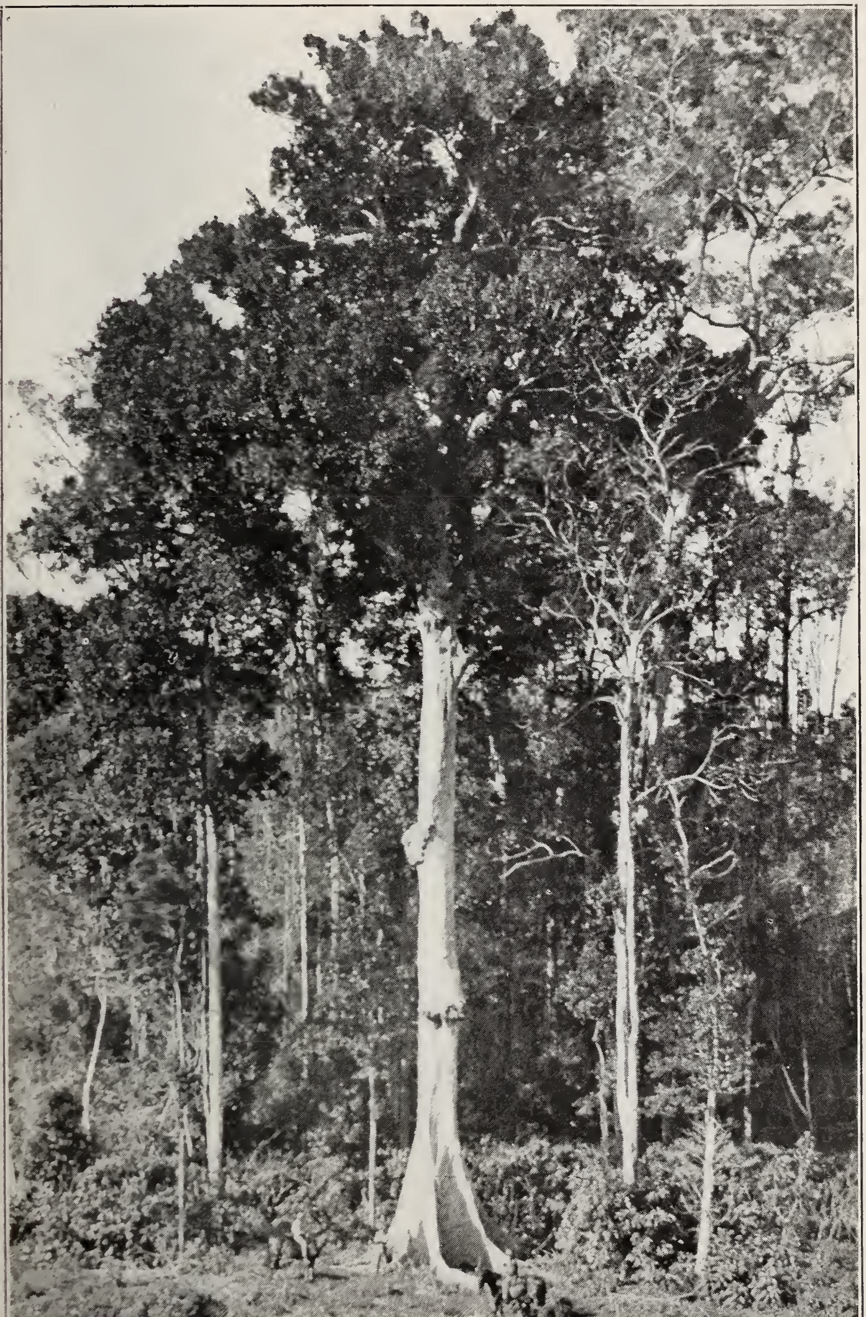


Fig. 188.—Giant Water Gum (*Eugenia Francisii*). On edge of patch of rain forest left in clearing, Kin Kin, about 26.2° S. Two horsemen and a man on foot are at base of stem. Total height of tree about 140 ft. The large swellings on the stem are fairly commonly seen on this species.

(*Photo.: W. D. F.*)

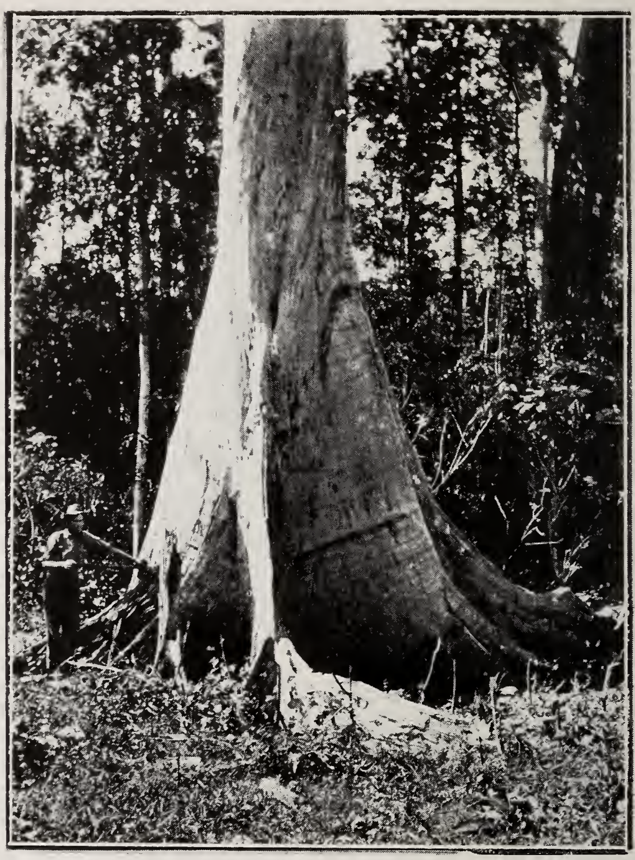


Fig. 189.—Giant Water Gum (*Eugenia Francisii*), on edge of patch of rain forest left standing in clearing at Kin Kin, about 26.2° S. The same tree is shown at full length in previous Fig. (188).

(*Photo.: W. D. F.*)

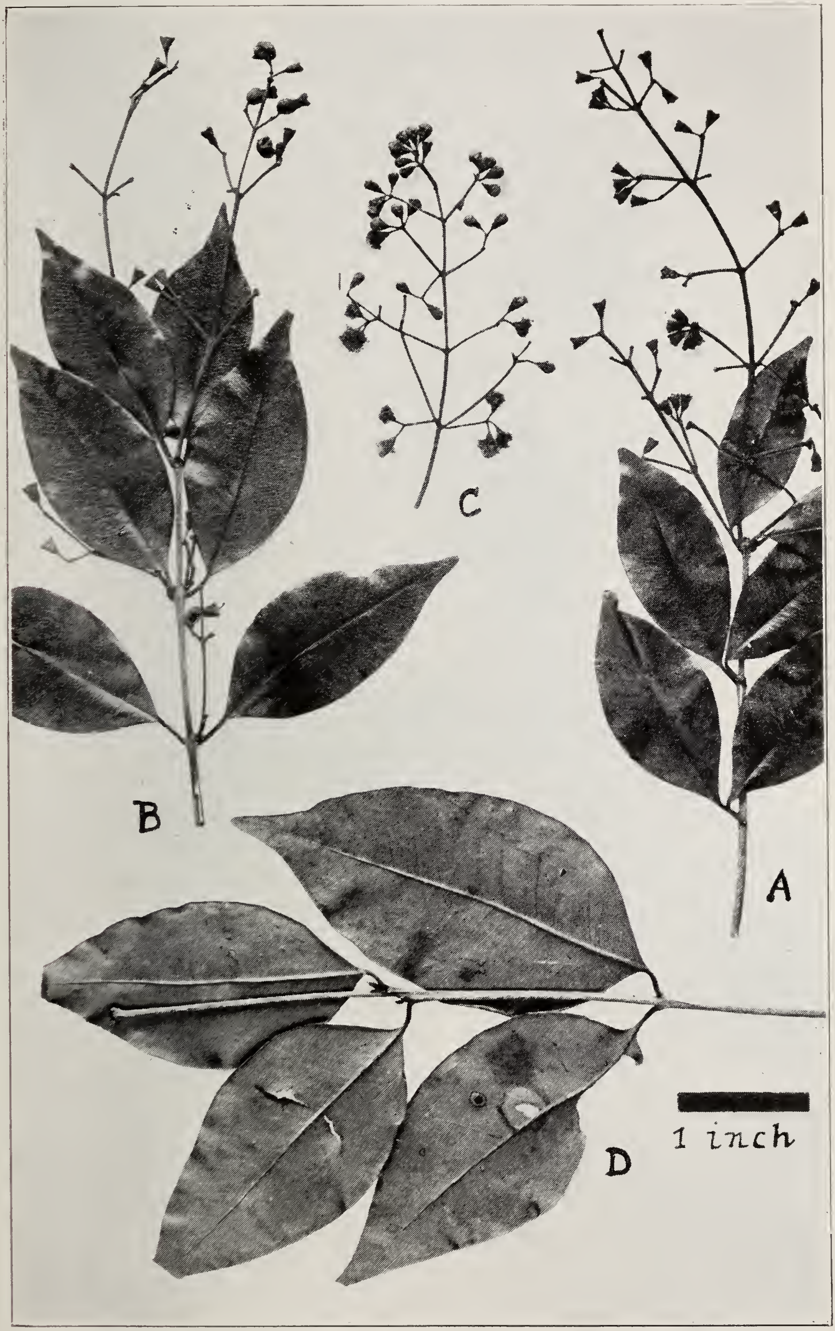


Fig. 190.—Giant Water Gum (*Eugenia Francisii*). A and B, inflorescence-bearing branchlets; C, inflorescence with a few expanded flowers; D, branchlet showing underside of larger leaves. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

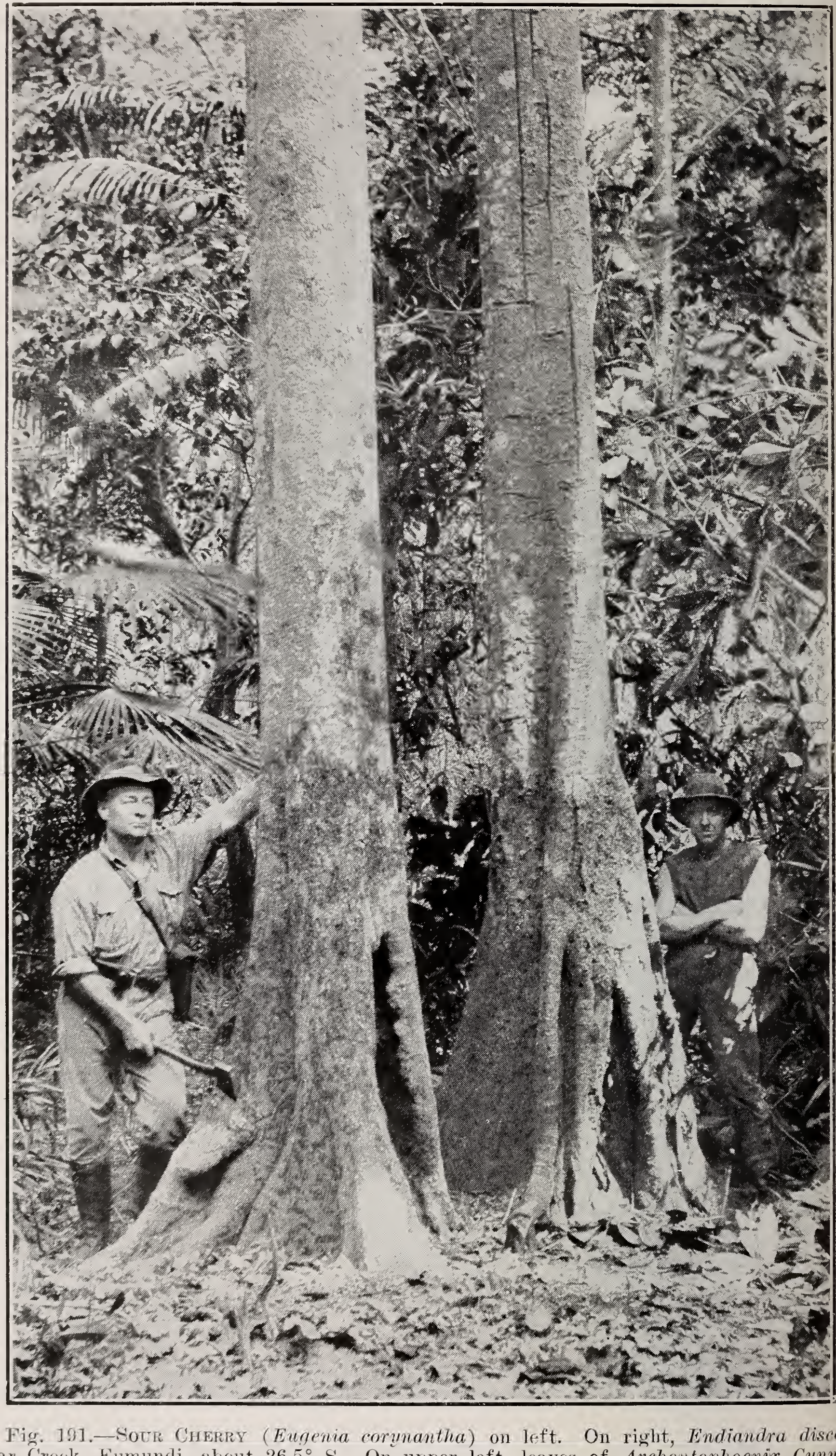


Fig. 191.—Sour Cherry (*Eugenia corynantha*) on left. On right, *Endiandra discolor* Cedar Creek, Eumundi, about 26.5° S. On upper left, leaves of *Archontophoenix Cunninghamii,* and lower down leaves of *Livistona australis.* The scales of the bark of *Eugenia corynantha* are shown in upper part. Both trees are hollow at base.

(*Photo.: W. D. F.*)

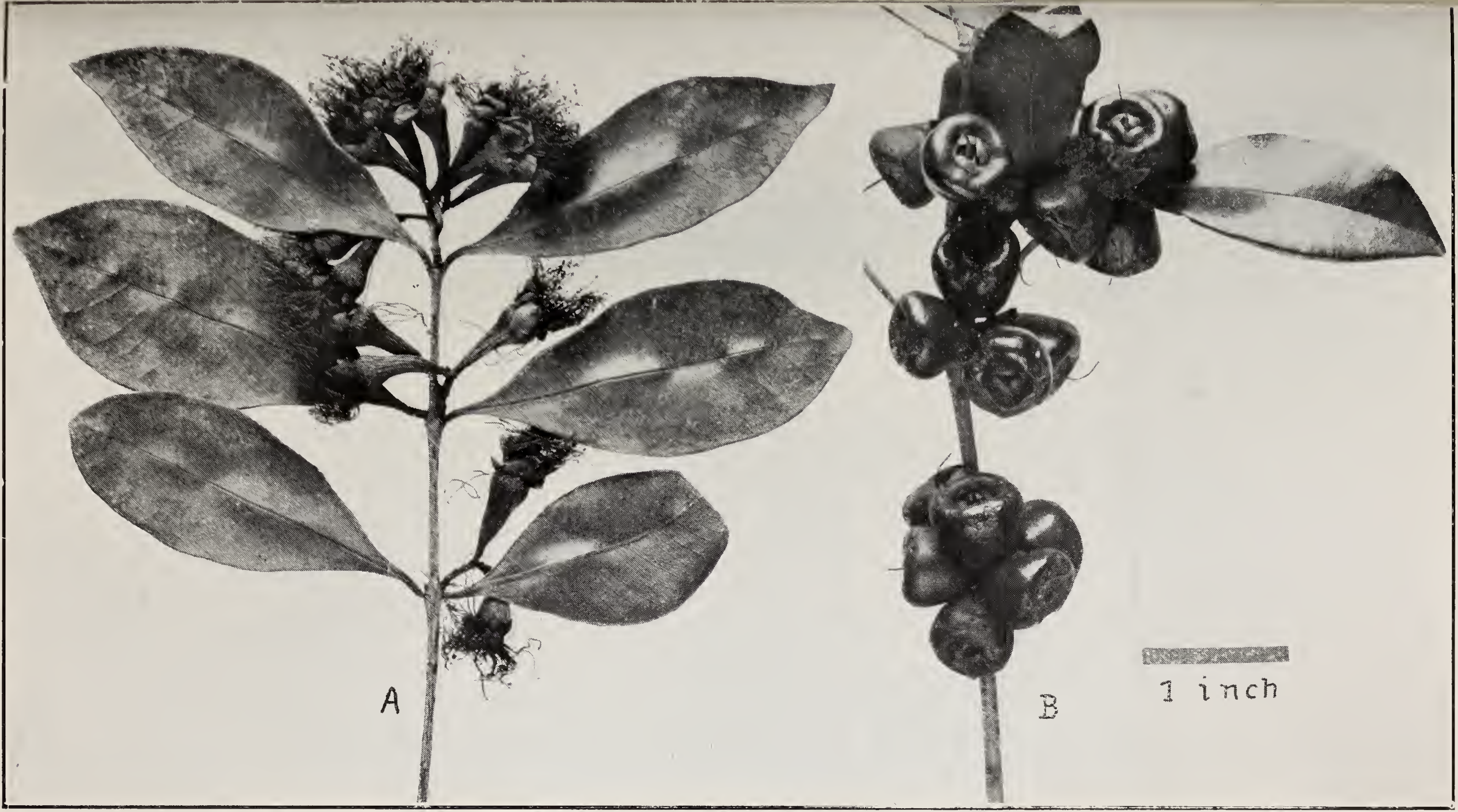


Fig. 192.—Sour Cherry (*Eugenia corynantha*). A, inflorescence-bearing branchlet; B, fruit-bearing branchlet. A, in dry state; B, in fresh state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

which cohere in a dome-shaped covering, about $\frac{1}{4}$ in. in diameter, which falls away as the flower expands; each petal when separated is round and measures about $\frac{1}{5}$ in. in diameter. On the inner side of the petals are the numerous (over 25) red stamens attaining nearly $\frac{3}{4}$ in. in length. The ovary fills the lower part of the calyx and is surmounted by a slender style about $\frac{1}{2}$ in. long. J. H. Maiden (Forest Flora of N.S.W., vol. 7, p. 410, 1922) describes the fruit as white suffused with green, oblate-spheroid in shape, and attaining $2\frac{1}{2}$ in. in diameter; he figures the fruit and the various parts of the flowers. Flowering period: December.

Distribution.—Scrubs of the Richmond and Tweed Rivers (J. H. Maiden).

Reference.—*Eugenia Moorei* F.v.M., Fragmenta Phytographiae Australiae, vol. 5, p. 33, 1865–1866.

Eugenia Hodgkinsoniae F.v.M. Small tree. Leaves opposite; stalks $\frac{1}{5}$–$\frac{1}{3}$ in.; blades drawn out into blunt point at apex, venation plainer beneath, 3–$5\frac{1}{2}$ in. long, 2–3 times as long as broad. Fruit described as globular and $1\frac{1}{2}$ in. in diameter, containing a single seed.—Richmond River (F.v.M.) to Eumundi.

Eugenia brachyandra Maid. & Betche. Red Apple. Figs. 193 and 194.

Derivation.—Eugenia in honour of Prince Eugene of Savoy; brachyandra from Greek *brachys*, short; *andros*, a male (referring to the short stamens of the species).

Description.—A tree attaining over 100 ft. in height and a stem diameter of 3 ft. Stem in large trees somewhat buttressed at base. Bark grey, smooth, when cut, brown in colour and measuring $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. 3 in. Sapwood light brown. All parts hairless. Young branchlets often 4-angled. Leaf-stalks $\frac{1}{8}$–$\frac{1}{4}$ in. long, often red in colour. Leaves opposite, elliptical, tapering towards both ends or drawn out into a point at the apex, upper surface rather glossy, underside paler, the midrib and lateral nerves visible on both surfaces, oil-dots faint or obscure; measurement of leaf-blade, 3–$5\frac{1}{2}$ in. long, $2\frac{1}{2}$–$4\frac{1}{2}$ times as long as broad. Flowers in inflorescences (panicles) at the ends of branchlets, the inflorescences much shorter than the leaves. Individual flowers almost stalkless. The lowermost and largest part of the flower, the calyx, is shortly bell-shaped, about $\frac{1}{8}$ in. in diameter, with 5 or sometimes 4 or 6 round lobes at the rim measuring about $\frac{1}{20}$ in. long. Alternating with the calyx lobes and of about the same length are 5 or sometimes 4 or 6 round petals. On the inner side of the petals are numerous (over 25) stamens about the same length as the calyx lobes. The ovary fills the lower part of the calyx and is surmounted by a style about $\frac{1}{16}$ in. long. Fruit globular, red when ripe, 1 in. or more in diameter, marked at the top by the circular scar of the calyx rim, containing a single seed surrounded by a fleshy coating. Flowering period: December; fruiting period, March and April.

Distribution.—Coastal scrubs of Eastern Australia from Richmond River, N.S.W. (Maiden and Betche), to Gympie, Queensland.

Reference.—*Eugenia brachyandra* Maiden and Betche, Proceedings of the Linnean Society of N.S. Wales, vol. 23, p. 15, 1898.

Eugenia Luehmanni F.v.M. Small-leaved Water Gum, Cherry Alder. Fig. 195.

Derivation.—Eugenia in honour of Prince Eugene of Savoy; Luehmanni after J. G. Luehmann.

Description.—A tree attaining 100 ft. in height and a stem diameter of 3 ft. Stem buttressed at the base in the large trees, which resemble those of *Eugenia Francisii* in appearance. Bark grey or brown. All parts hairless. Branchlets very slender. Leaf-stalks $\frac{1}{12}$–$\frac{1}{8}$ in. long. Young growth a bright pink colour. Leaves opposite, egg-shaped or lance-shaped in outline, drawn out into a long prominent point at the apex, upper surface glossy with the midrib alone prominent, the midrib and lateral nerves visible on the underside; measurement of leaf-blade, $1\frac{1}{2}$–2 or occasionally 3 in. long, 2–4 times as long as broad. Flowers in small inflorescences (panicles) at the ends of branchlets or occasionally in the forks of the upper leaves, the inflorescences sometimes as long as the leaves but often shorter. Stalklets of flowers short, often scarcely distinct from the lower part of the calyx. The lowermost part of the flower, the calyx, is funnel-shaped, about $\frac{1}{5}$ in. long and about $\frac{1}{8}$ in. in diameter at the rim, where it is divided into 4 or 5 rounded lobes about $\frac{1}{16}$ in. long. On the inner side of the calyx lobes and alternating with them are 4 or 5 round petals each about $\frac{1}{12}$ in. in diameter. On the inner side of the petals are numerous (over 20) slender stamens about $\frac{1}{5}$ in. long. The ovary fills the lower part of the calyx and is surmounted by a slender style about $\frac{1}{5}$ in. long. Fruit red, somewhat pear-shaped, about $\frac{1}{2}$ in. long, containing a single seed. Flowering period: November and December.

Distribution.—Coastal scrubs of Eastern Australia from the Richmond River, N.S.W., to Cairns in North Queensland. The tree is very common in the scrubs, growing in the sandy soil near the beaches at the mouths of the Nerang, Maroochy, and Mooloolah Rivers. Confined to Australia.

Uses.—The properties of the timber are not well known. The young, brightly coloured leaves are often used for table decoration.

References.—*Eugenia Luehmanni* F.v.M., Victorian Naturalist, vol. 9, p. 10, 1892 ; *Eugenia parvifolia* C. Moore, Proceedings of Royal Society of N.S. Wales, vol. 27, p. 85.

Eugenia australis Wendl. Scrub Cherry. Lillipilli (*see Eugenia Smithii*). Fig. 196.

Derivation.—Eugenia in honour of Prince Eugene of Savoy ; *australis* Latin, southern.

Description.—A tree attaining a height of about 60 ft. and a stem diameter of about 1 ft. Stem not prominently buttressed at the base. The stems frequently overhang watercourses, and the bole of the tree is often short and irregular. Bark brown, somewhat scaly. All parts hairless. Leaf-stalks $\frac{1}{12}$–$\frac{1}{4}$ in. long. Leaves opposite, lance-shaped, apex drawn out into a point or occasionally blunt or rounded, midrib and lateral nerves visible on both surfaces ; measurement of leaf-blade, $1\frac{1}{2}$–3 in. long, 2–3 times as long as broad. Flowers single or in threes on slender common stalks (peduncles) in the forks of the leaves or in inflorescences (panicles) at the ends of branchlets, the inflorescences seldom longer than the leaves. The lowermost part of the flower, the calyx, is funnel-shaped, varying in length from $\frac{1}{4}$–$\frac{3}{8}$ in., bearing 4 rounded or almost triangular lobes about $\frac{1}{8}$ in. long at its rim. On the inner side of the calyx lobes and alternating with them are 4 round cream-coloured petals measuring about $\frac{1}{5}$ in. in diameter. On the inner side of the petals are numerous (over 25) slender stamens about $\frac{1}{2}$ in. long. The ovary fills the lower part of the calyx and is surmounted by a slender style about $\frac{1}{2}$ in. long. Fruit oval, red, about $\frac{1}{2}$ in. long, crowned by the persistent calyx lobes, containing a single seed, the surrounding pulp sharply but pleasantly acid. Flowering period irregular.

Distribution.—Coastal scrubs of Eastern Australia from Illawarra, N.S.W. (Bentham), to Atherton, North Queensland. The trees are often very plentiful along watercourses, which they overlean.

Uses.—The timber should be useful for general indoor work.

References.—*Eugenia australis* Wendl. in Link Enum. Hort. Berol. ii., 28 ; *Eugenia myrtifolia* Sims, Botanical Magazine, tablet 2230 ; *Eugenia paniculata* Banks in Gaertner's Fructibus et Seminibus Plantarum, vol. i., p. 167, 1788.

Eugenia cyanocarpa F.v.M. Small or large tree, often flowering when shrubby. Bark of large trees like that of *Eugenia Francisii* and stems somewhat buttressed. Leaves opposite ; stalks $\frac{1}{5}$–$\frac{1}{4}$ in. ; blades drawn out into a point at apex, often narrowed at base, 2–$3\frac{3}{4}$ in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ times as long as broad. Inflorescences (panicles) at ends of branchlets or in or above upper leaf-forks (axils), the panicles sometimes as long as the leaves. Calyx bell-shaped, about $\frac{1}{8}$ in. long, its rim with mostly 4 triangular lobes about $\frac{1}{24}$ in. long. Petals mostly 4, almost circular, $\frac{1}{10}$–$\frac{1}{8}$ in. across. Stamens numerous (over 20), about $\frac{3}{8}$ in. long. Fruit globose or urn-shaped, purplish blue, $\frac{1}{2}$–1 in. in diameter, containing a single globose seed $\frac{1}{4}$–$\frac{3}{8}$ in. long.—Port Hacking (Maid. & Betche) to Rockingham Bay (F.v.M.).

5. BACKHOUSIA.

Backhousia myrtifolia Hook. & Harv. Shrub or tree 20 ft. high. Young shoots, young branchlets, and sometimes underside of leaves more or less hairy. Leaves opposite ; stalks $\frac{1}{12}$–$\frac{1}{4}$ in. ; blades egg-shaped or lance-shaped in outline, drawn out into point at apex, midrib and lateral nerves visible on both sides, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, 2–3 times as long as broad. Outer and largest part of flower, the calyx, bell-shaped, hairy, and about $\frac{1}{12}$ in. long at base, in the upper part it is divided into 5 yellowish-green, lance-shaped lobes about $\frac{1}{4}$ in. long ; these lobes persist on the fruit. The fruit consists of the slightly enlarged calyx enclosing the fertilised and developed 2-celled ovary.—Port Jackson (Benth.) to Fraser Id.

Backhousia citriodora F.v.M. Sweet Verbena Tree. Up to 12 in. stem diameter. Leaves and green parts with strong citron-like odour when crushed. Young shoots, young branchlets, and often underside of leaves hairy. Leaves opposite ; stalks $\frac{1}{4}$–$\frac{5}{8}$ in. ; blades with slightly toothed or entire margins, venation prominent below, 2–4 in. long, $2\frac{1}{2}$–4 times as long as broad. The outer part of flower, the calyx, consists of a lower, bell-shaped, hairy tube about $\frac{1}{12}$ in. long, and the upper part is composed of 5 horizontally spreading, concave, oval lobes $\frac{1}{8}$–$\frac{1}{6}$ in. long. In the fruit the calyx lobes persist and the tube expands slightly. The calyx tube contains the basal part of the fruit, which is 2-celled.—Brisbane to Mackay.

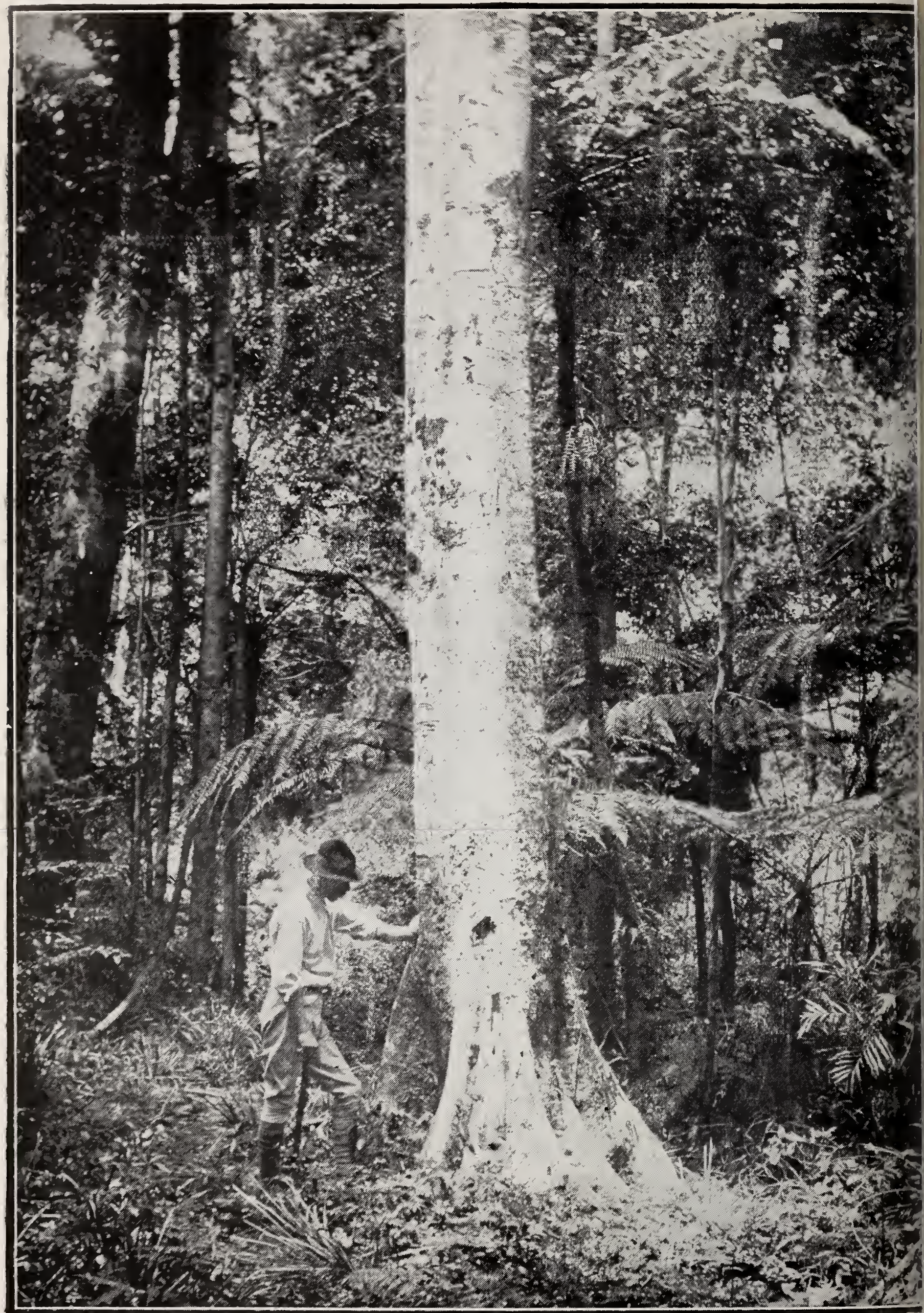


Fig. 193.—Red Apple (*Eugenia brachyandra*). Roberts Plateau, Macpherson Rang
about 28.3° S. The Prickly Tree Fern (*Alsophila Leichhardtiana*) is conspicuous in t
picture, one very long-stemmed plant being situated immediately to the right of the tr
stem, and reaching almost to the upper limit of the picture.

(*Photo.: W. D. F.*)

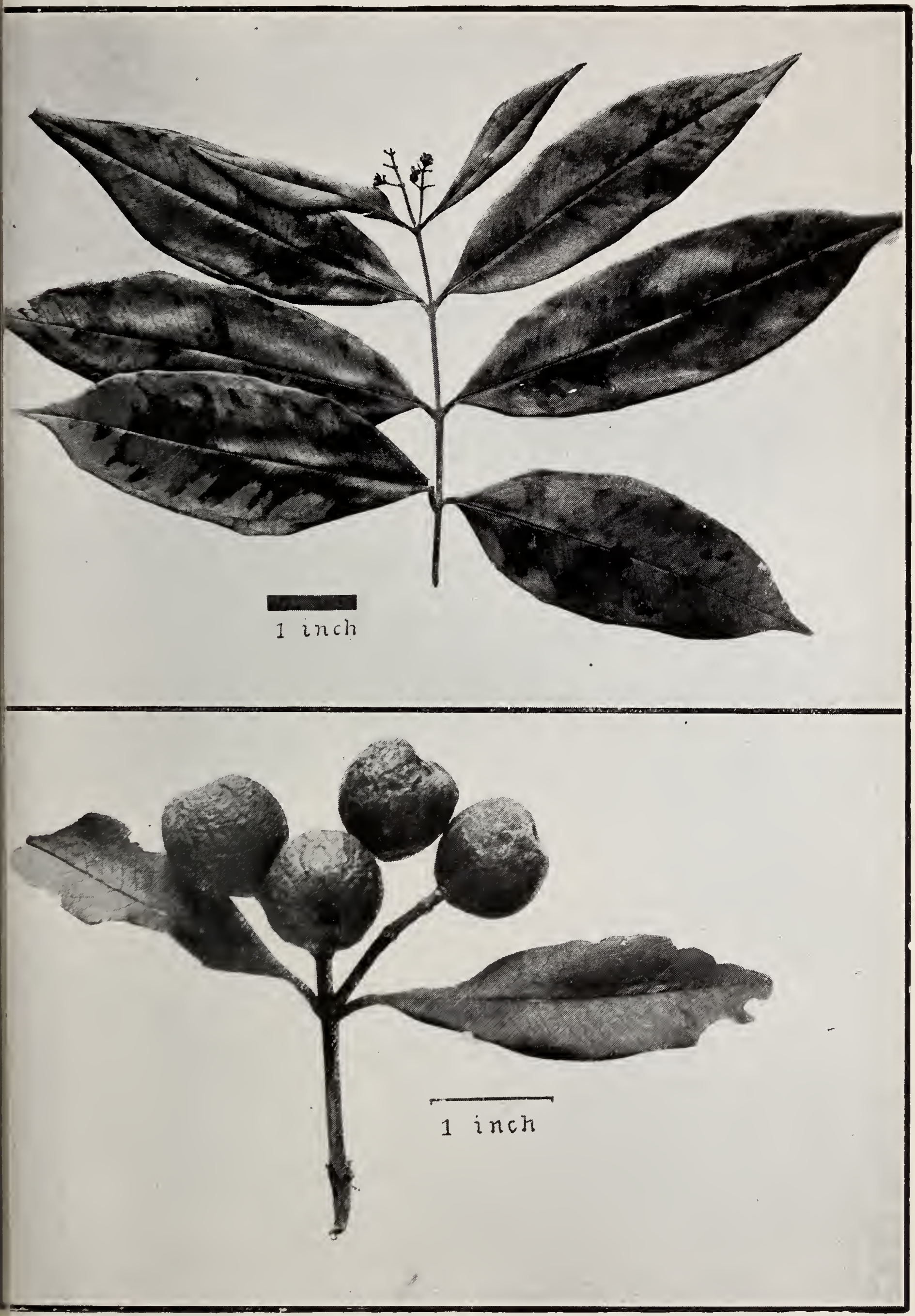


Fig. 194.—Red Apple (*Eugenia brachyandra*). Branchlet in dry state with inflorescence om which most of the flowers have fallen) in upper part. Fresh, fruit-bearing twig in ver part.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

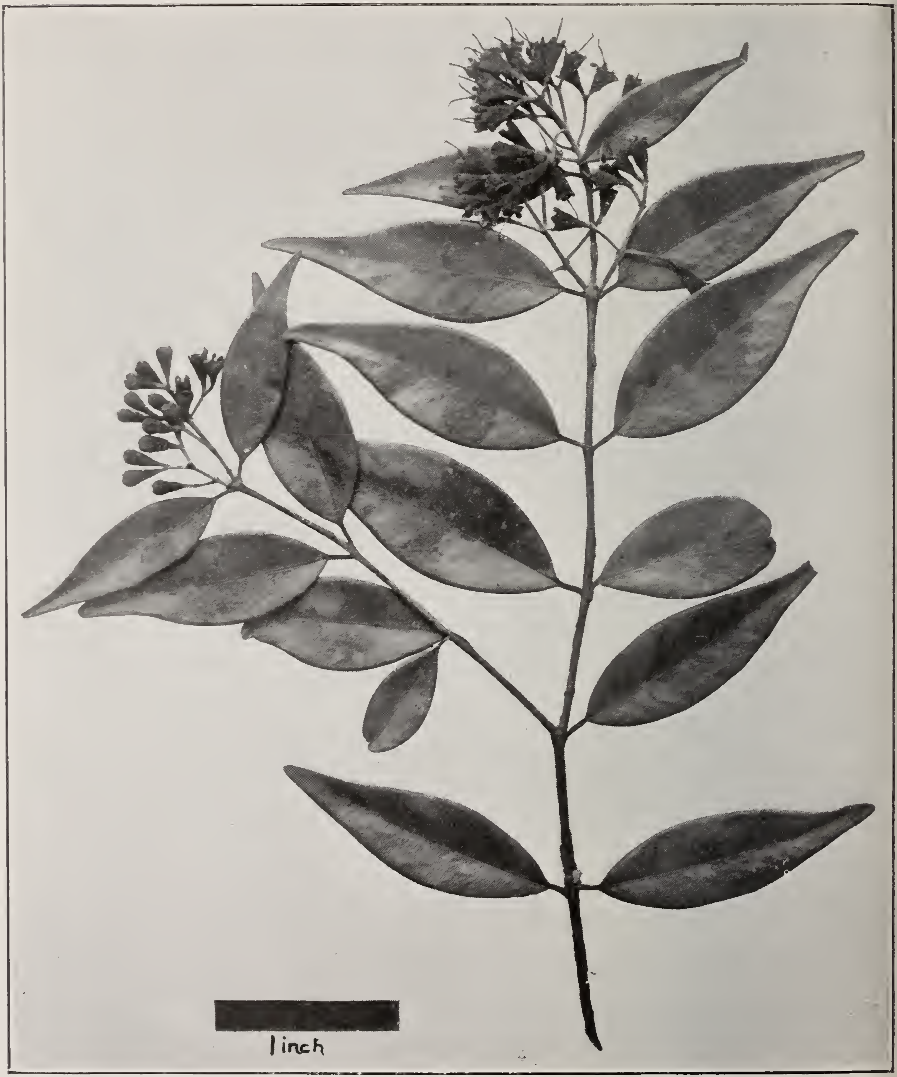


Fig. 195.—Small-leaved Water Gum (*Eugenia Luehmanni*). Inflorescence-bearing branchlet. Dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

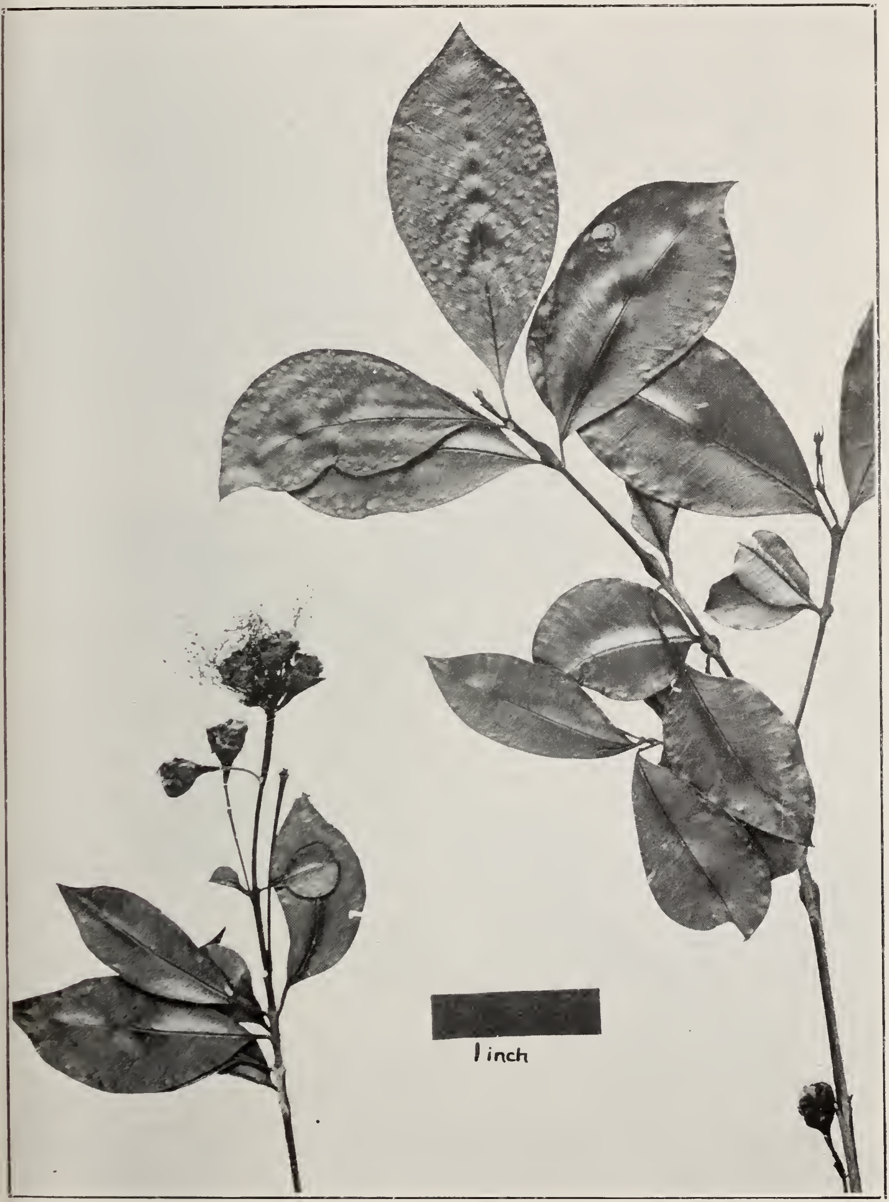


Fig. 196.—Scrub Cherry (*Eugenia australis*). Inflorescence-bearing branchlets. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

6. XANTHOSTEMON.

Xanthostemon oppositifolius F.M.B. Penda, Luya's Hardwood. Figs. 197, 198, 199.

Derivation.—Xanthostemon from Greek *xanthos*, yellow ; *stemon*, a filament (alluding to the yellow stamens of the original species of the genus) ; oppositifolius from Latin *oppositus*, standing in front ; *folium*, a leaf (indicating the opposite character of the leaves).

Description.—A large tree attaining 140 ft. in height and a stem diameter of 5 ft. Stem sometimes flanged at the base but not prominently buttressed. Bark light grey or brownish, often scaly, shed in flakes or oblong pieces ; when cut, brown, paler towards sapwood, measuring $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. 6 in. Sapwood pale yellow. Heartwood dark brown when green. Young shoots and inflorescences very finely hairy. Leaves opposite. Leaf-stalks $\frac{1}{4}$–$\frac{1}{2}$ in. long. Leaf-blades oval or elliptical or egg-shaped in outline, mostly blunt at apex, often very shortly narrowed into the stalk at the base ; midrib, lateral nerves, and net-veins prominent on both surfaces ; measurement of leaf-blades, 2–3 in. long, 2–3 times as long as broad. Flowers in inflorescences (cymes or umbels) consisting of groups of 3–5 flowers, each group inserted on a stalk $\frac{1}{2}$–$1\frac{1}{2}$ in. long arising from the fork (axil) of a leaf and each flower borne on a stalklet $\frac{1}{4}$–$\frac{1}{2}$ in. long. Each flower when expanded is 1 in. or more in diameter. The lowermost part of the flower, the calyx, is about $\frac{3}{8}$ in. in diameter and has at its margin 5 or 4 oval lobes exceeding $\frac{1}{12}$ in. in length. On the inner side of the calyx are the 5 or 4 petals, white, circular, and about $\frac{1}{6}$ in. in diameter. On the inner side of the petals are the numerous stamens, which are very slender and about $\frac{1}{2}$ in. long. The ovary is situated in the centre of the flower, is egg-shaped, finely downy, and bears at its summit the style, which is about as long as the stamens. The fruit is seated on the calyx, is broadly egg-shaped, 3-celled, about $\frac{3}{8}$ in. long, splits open in 3 equal pieces, and contains a number of flattened angular seeds. Flowering period irregular.

Distribution.—Limited to Queensland. Confined to a relatively small area of the coastal scrubs between Maryborough on the north and Nambour on the south. It is very frequent in the Noosa Shire, in parts of which it is the most common species of the scrub.

Uses.—The timber should be useful for those purposes which require hardness and lack of fissility. The wood is brown in colour, often interlocked, and very hard. It is not very durable in the ground.

Reference.—*Xanthostemon oppositifolius* F. M. Bailey, 2nd Addition to 3rd Supplement to Synopsis of Queensland Flora ; Queensland Flora, vol. 2, p. 642, 1900.

7. SYNCARPIA.

Syncarpia subargentea C.T.W. Giant Ironwood. In the smoothness and colour of its bark this tree resembles the Ironwood, *Myrtus Hillii* ? but grows to a much larger size. Ironwood Box. Figs. 200 and 201.

Derivation.—Syncarpia from Greek *syn*, with ; *karpos*, fruit (alluding to the individual fruits being united in heads or masses) ; subargentea from Latin *sub*, slightly ; *argenteus*, silvery (referring to the white underside of the leaves).

Description.—A large tree attaining a height of about 120 ft. and a stem diameter of about 3 ft. Stem frequently buttressed at the base. Bark very smooth and shining, brown, green, or copper-coloured, shed in thin flakes ; when cut, green towards outer surface, flesh-coloured towards sapwood, measuring $\frac{1}{8}$ in. thick on a tree with a stem diameter of 3 ft. Young shoots and flowers covered with fine rust-coloured down. Branchlets often 4-angled. Leaf-stalks $\frac{1}{8}$–$\frac{3}{8}$ in. long. Leaves opposite, oval, or elliptical in outline, mostly protracted into a point at the apex, underside more or less white or silvery, the midrib and lateral nerves visible on both surfaces ; numerous fine net-veins also are often conspicuous on both surfaces especially in leaves on barren shoots ; measurement of leaf-blade, 2–$3\frac{1}{2}$ in. long, 2–4 times as long as broad. Flowers in dense globular heads about $\frac{3}{8}$ in. in diameter, the heads inserted on stalks from $\frac{1}{4}$–$\frac{1}{2}$ in. long and situated in the axils of young leaves or towards the ends of branchlets. The individual flowers, which are united towards the base in the globular heads, consist of a cup-shaped outer envelope (calyx) about $\frac{1}{10}$ in. in diameter, which is divided for about half its length into 5 broadly triangular lobes ; within the calyx are 12–15 bristle-like stamens about $\frac{1}{5}$ in. long, and within the stamens is the minute globular ovary tapering into a style about $\frac{1}{10}$ in. long. There are no petals in the flowers, and all parts of the flowers are covered with dense rust-coloured down. No fruiting specimens are available for description.

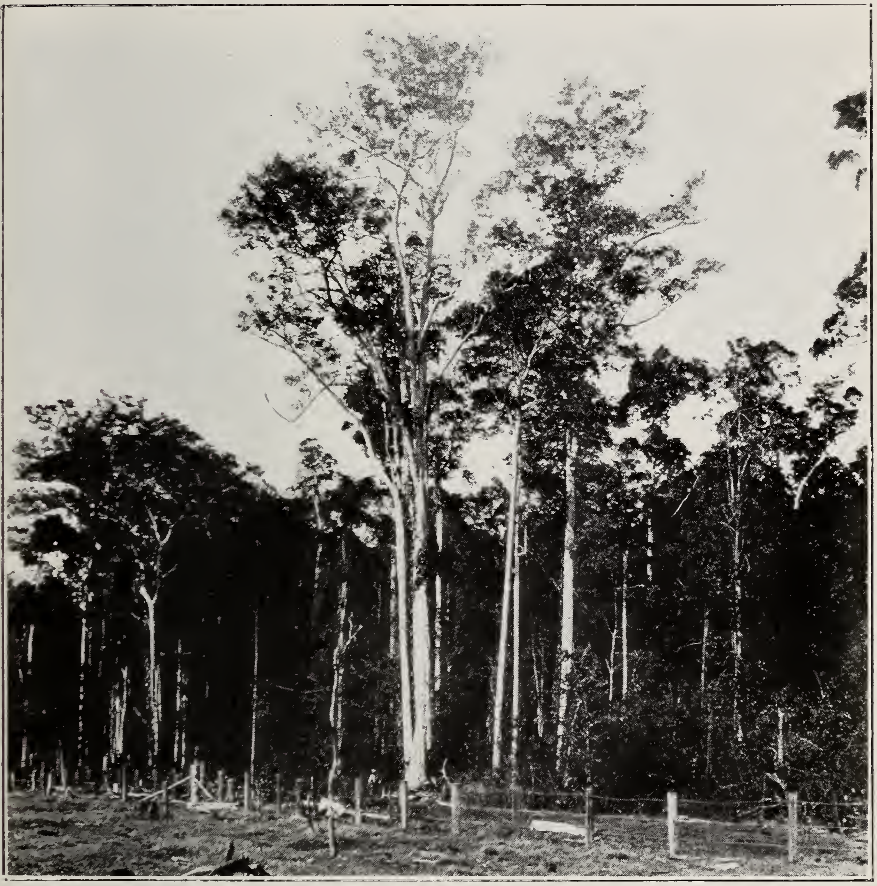


Fig. 197.—Cleared edge of rain forest on roadside, Kin Kin, about 26.2° S. The six large trees towards middle of picture are Pendas (*Xanthostemon oppositifolius*). At the base on left of large tree a figure is shown; this gives some idea of the scale. Total height of large tree about 140 ft.

(*Photo.: W. D. F.*)

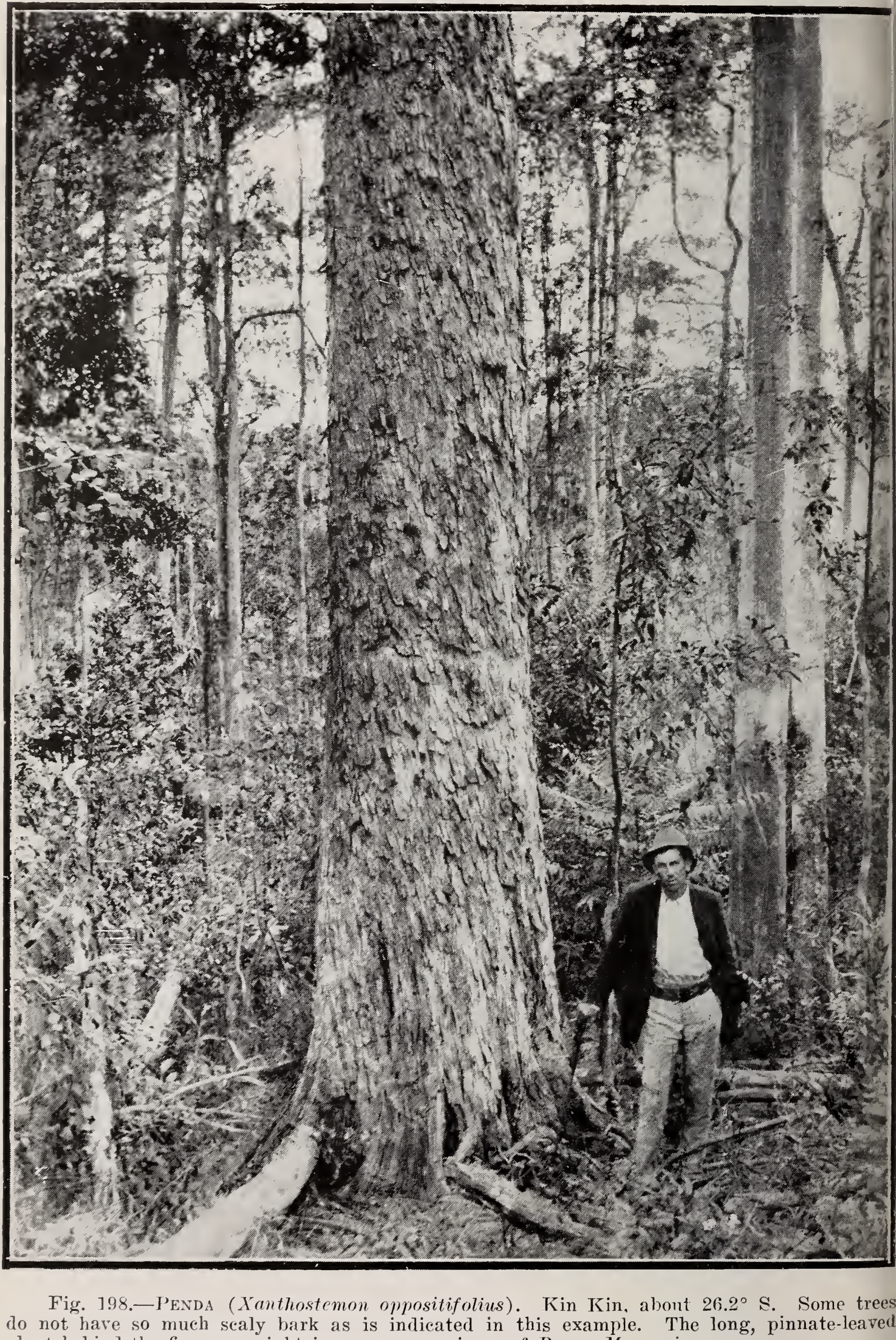


Fig. 198.—Penda (*Xanthostemon oppositifolius*). Kin Kin, about 26.2° S. Some trees do not have so much scaly bark as is indicated in this example. The long, pinnate-leaved plant behind the figure on right is a young specimen of *Panax Murrayi*.

(*Photo.: W. D. F.*)

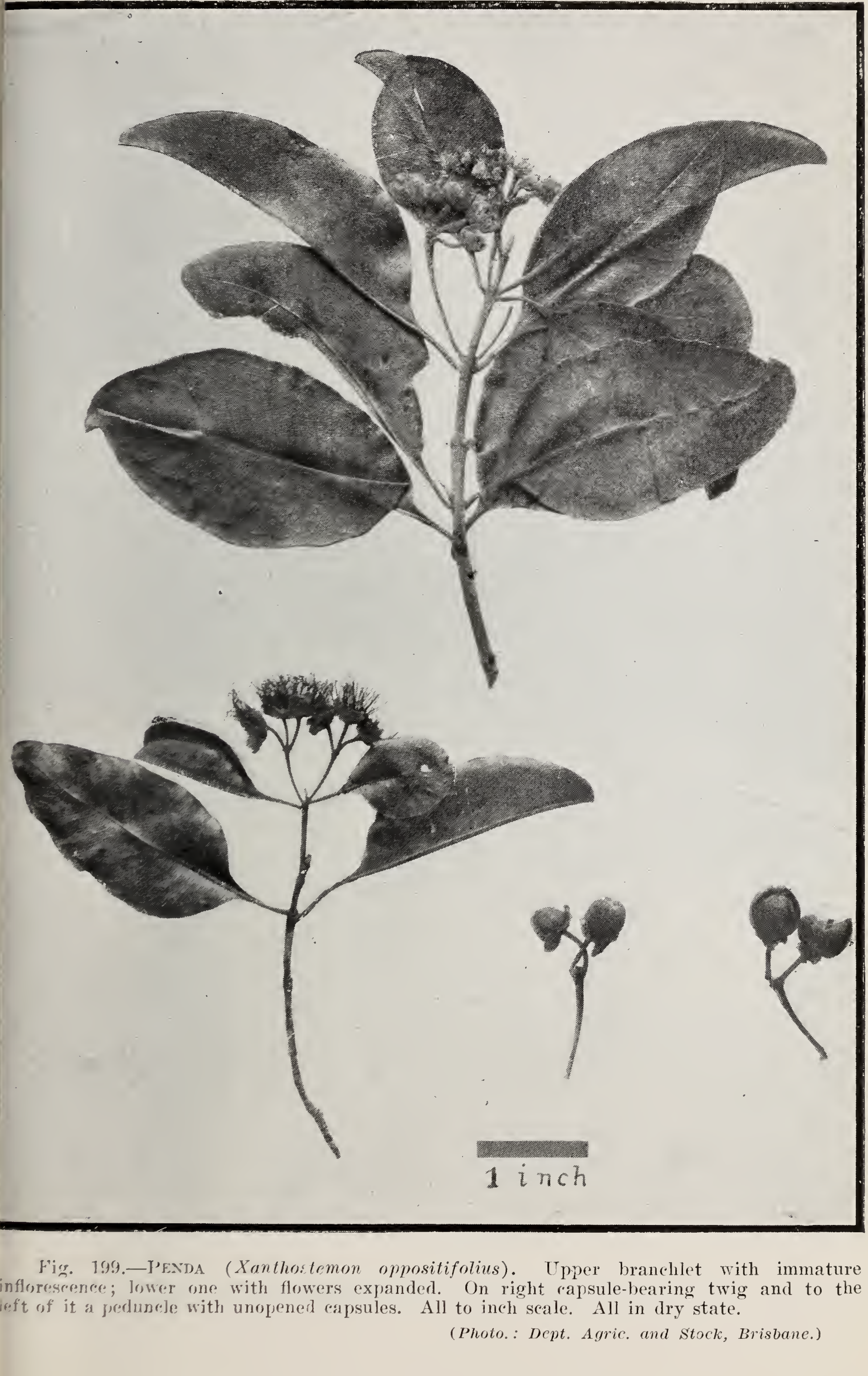


Fig. 199.—PENDA (*Xanthostemon oppositifolius*). Upper branchlet with immature inflorescence; lower one with flowers expanded. On right capsule-bearing twig and to the left of it a peduncle with unopened capsules. All to inch scale. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

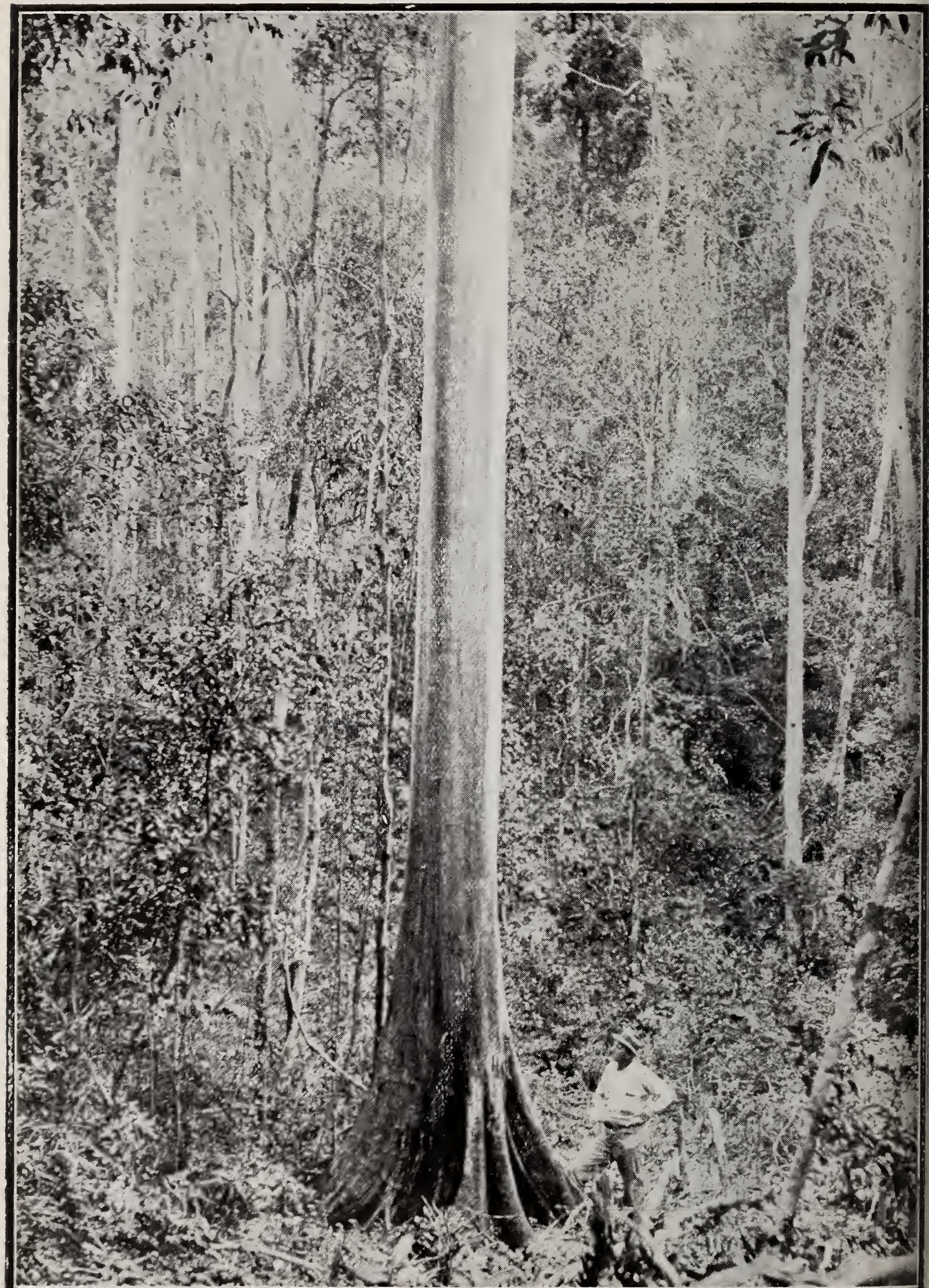


Fig. 200.—Giant Ironwood (*Syncarpia subargentea*). Imbil, about 26.4° S. The smooth bark and somewhat buttressed stem are indicated in the picture.

(*Photo.: W. D. F.*)

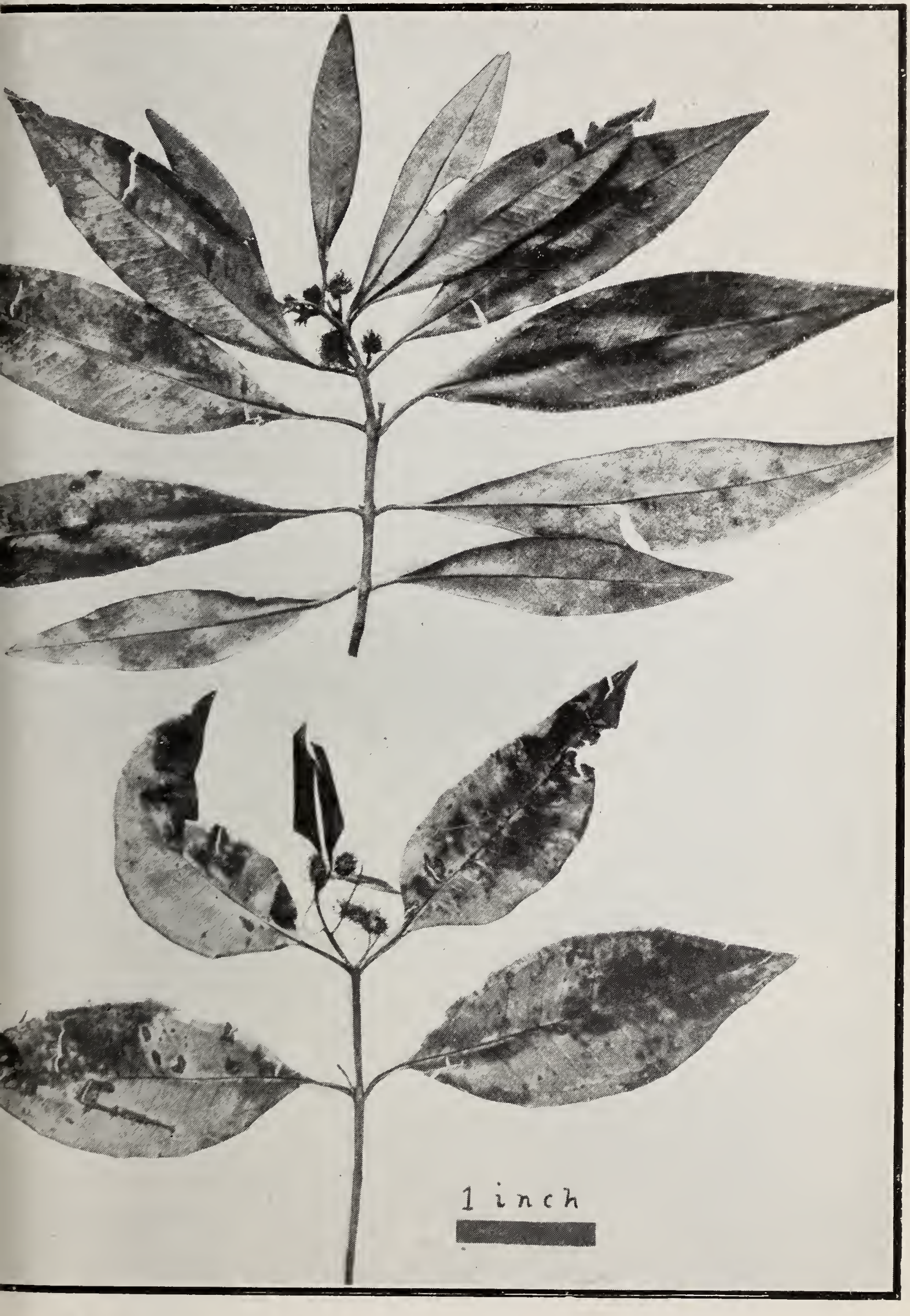


Fig. 201.—Giant Ironwood (*Syncarpia subargentea*). Inflorescence-bearing branchlets. Dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

Distribution.—Imbil, Mary Valley Line, and Mt. Alford, Boonah district. It is a very common tree in the scrubs of the areas mentioned, and as the two localities are over 100 miles apart it is probable that the species will be found to have a fairly wide distribution. It has also been found at Theebine, 30 miles north of Imbil. Confined to Queensland.

Uses.—No special use has so far been made of the timber.

Reference.—*Syncarpia subargentea* C. T. White, Botany Bulletin No. 21, p. 8, 1919 (with figure).

Syncarpia leptopetala F.v.M. (*Metrosideros leptopetala* F.v.M.). Described as tree 50 ft. high. Flowering as shrub. Young branchlets more or less 4-angular. Leaves opposite ; stalks ¼–⅜ in. ; blades paler beneath, drawn out into point at apex, often narrowed at base, 2½–3½ in. long, 2–3 times as long as broad. Flowers collected in dense globular heads ⅝–¾ in. in diameter, each head on stalk ½–1½ in. long and the heads in groups at or near ends of branchlets. Individual flowers closelyp ressed together but free from one another in the heads ; calyx cup- or bell-shaped, hairy about $\frac{1}{12}$ in. long ; stamens 20 or more, up to ¼ in. long.—Interior of N.S. Wales (Benth.) ; Brisbane River. K. Domin (Bibl. Botan. 89, 5, 1026, 1928) has recently made a new genus to receive this species under name *Choricarpia leptopetala.*

8. TRISTANIA.

Tristania neriifolia R.Br. Shrub or small tree. Leaves opposite ; stalks up to ¼ in. ; blades pale or whitish beneath, narrowed at both ends, 1¼–3 in. long, 5–8 times as long as broad. Fruit broadly bell-shaped, about ⅙ in. long, rim with 5 more or less persistent, triangular calyx lobes about $\frac{1}{12}$ in. long. Fruit 3-celled with 3 apertures at apex.—Cooma, N.S.W. (Betche), to Port Jackson and Blue Mountains (Benth.).

Tristania conferta R.Br. Sometimes known as Brisbane Box and as Brush Box, or Scrub Box. Figs. 202 and 203.

Derivation.—Tristania, after Jules de Tristan ; Latin *conferta,* brought together (alluding to the leaves being crowded towards the ends of the branchlets).

Description.—A tree attaining 120 ft. in height and a stem diameter of 7 ft. Stem not prominently buttressed. Bark brown or less frequently grey, scaly or box-like and very variable, smooth and brown or green on the branches and upper part of the stem ; when cut light brown, becoming paler inwards, measuring ½ in. thick on a tree with a stem diameter of 7 ft. Young shoots and often the flowers clothed with white or silky hairs. Young shoots exuding a milky juice when broken. Young buds protected by brown overlapping scales measuring ¼–¾ in. long. Leaf-stalks ½–¾ in. long. Leaves alternate, 3, 4, or 5 crowded together at the ends of branchlets, elliptical in outline, tapering towards both ends and pointed at the apex, midrib and lateral nerves visible on both surfaces, numerous fine net-veins often visible on the underside, which is often slightly paler than the upper side ; measurement of leaf-blade, 3½–6 in. long, 2 to almost 4 times as long as broad. Flowers in small dense inflorescences (cymes) of 3–8 flowers situated in the forks of leaves towards the ends of branchlets and measuring 1–1½ in. long. Individual flowers borne on short stalklets. Flowers over 1 in. in diameter when expanded. The outermost part of the flower, the calyx, bell-shaped, about ⅓ in. long, its rim divided into 5 narrow pointed lobes about ¼ in. long. On the inner side or above the calyx and alternating with its lobes are 5 oval or round white or cream-coloured petals about ⅓ in. long. On the inner side of the petals and opposite to them are 5 staminal bundles about ½ in. long ; instead of being single and free from the base the stamens in this and a few other genera are united in bundles. The ovary fills the lower part of the bell-shaped calyx, is divided into 3 cells, and is surmounted at the summit by a slender style about ⅕ in. long. Fruit bell-shaped, ⅜–½ in. long, 3-celled, opening at the summit in 3 valves. Seeds numerous in each cell, very narrow, $\frac{1}{12}$ in. long. Flowering period : November, December.

Distribution.—Coastal scrub and forest country from Port Stephens, N.S.W. (J. H. Maiden), to Bowen, Queensland. Confined to Australia. It is very common on the borders of scrub and forest country and in places where these two types of vegetation intermingle. Bentham records the species from Port Essington, North Australia.

Uses.—The timber should be useful for general building purposes where it does not come into contact with very much moisture, and for general indoor fittings. F. M. Bailey states that it is used for joists, knees of vessels, and by the wheelwright. Very recently it has been used by some Brisbane printers as blocks to flatten down the face of type.

References.—*Tristania conferta* R. Brown in Aiton's Hortus Kewensis, ed. 2, iv., 417 ; *Lophostemon arborescens* Schott in Wien. Zeitschr. iii., 772, 1830. *Lophostemon australe* is a name used by nurserymen for this species.

Tristania laurina R.Br. This tree is called Water Gum probably because it often grows near streams ; *Eugenia Francisii* is also known as Water Gum. Kanuka Box. Figs. 204 and 205.

Derivation.—Tristania, after Jules de Tristan ; laurina from *Laurus*, the botanical name of the Laurel (in allusion to the supposed resemblance of the tree to the Laurel).

Description.—A tree attaining a height of 60 ft. and a stem diameter of over 2 ft. Stem not widely buttressed but often channelled or angular in cross-section. Bark grey, rather scaly, box-like, shed in rectangular or oblong flakes ; when cut, outer layer dark brown, inner layer light pinkish brown, measuring $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. Young shoots and flowers covered with whitish or silky hairs. Leaf-stalks $\frac{1}{4}$–$\frac{1}{2}$ in. long. Leaves alternate, narrowly elliptical in outline, mostly broader towards the apex, tapering gradually into the stalk at the base, mostly pointed at the apex, midrib and lateral nerves visible on the upper side, more obscure on the under side, upper surface dark green and glossy, under surface paler and dull ; measurement of leaf-blade, 2–5 in. long, 3–6 times as long as broad. Flowers in small inflorescences (cymes) in the forks of leaves towards the ends of branchlets, the cymes occasionally exceeding $\frac{1}{2}$ in. in length. Stalklets of individual flowers $\frac{1}{8}$–$\frac{1}{4}$ in. long. Flowers about $\frac{3}{8}$ in. in diameter when expanded. The lowermost part of the flower, the calyx, bell-shaped, about $\frac{1}{5}$ in. long, the rim divided into 5 small triangular teeth or lobes about $\frac{1}{16}$ in. long. On the inner side of the calyx and alternating with its lobes are 5 yellow oval petals about $\frac{1}{8}$ in. long. On the inner side of the petals are the numerous (over 20) stamens, which are united at the base into 5 bundles or groups, each bundle being opposite to each petal ; the bundles of stamens are about as long as the petals. The ovary fills the lower part of the calyx tube, is divided into 3 cells, and its convex or broadly conical summit is surmounted by a slender style about $\frac{1}{10}$ in. long. Fruit (capsule) dry, oval, nearly $\frac{3}{8}$ in. long, the lower half enclosed in and united with the calyx, opening out from the top in 3 valves, each valve bearing a ridge (dissepiment) along its middle. Seeds several or numerous in each cell of the capsule, flattened, nearly $\frac{1}{4}$ in. long and $\frac{1}{12}$ in. broad. Flowering period : December and January.

Distribution.—Coastal scrubs and forest country from Gippsland, Victoria (J. H. Maiden), to Eumundi, Queensland.

Uses.—The timber should be of use for general building purposes in places where it would not be exposed to excessive dampness.

Reference.—*Tristania laurina* R. Brown in Aiton's Hortus Kewensis, ed. ii., iv., 417.

Family ARALIACEAE.

Panax Murrayi F.v.M. (*Polyscias Murrayi* Harms.). Sometimes called Umbrella tree. Palm-like and unbranched when 20 ft. high, finally slightly branched. Young trees similar in appearance to young trees of *Ailanthus malabarica*. Attaining about 50 ft. high and 9 in. stem diameter. Leaves alternate, pinnate, consisting of 9–31 (or more) leaflets ; leaflet stalklets $\frac{1}{8}$–$\frac{1}{4}$ in. ; blades unequal-sided or curved, margins toothed or entire, apex drawn out into point, 3–6 in. long, 3–4 times as long as broad. Stalklets of fruit $\frac{1}{8}$–$\frac{1}{5}$ in. long, 7–15 springing from apex of branches of inflorescences. Fruit 2- sometimes 3-lobed, $\frac{1}{5}$–$\frac{1}{4}$ in. broad, surmounted by a minute forked style.—Twofold Bay (Benth.) to Atherton.

Panax elegans Moore & Mueller. Celery-wood, Black Pencil Cedar, Silver Basswood. Figs. 206 and 207.

Derivation.—Panax from Greek *pas*, *panros*, all ; *akos*, a cure (alluding to the curative properties of the original species of the genus) ; Latin *elegans*, neat or elegant.

Description.—A tree attaining a height of 90 ft. and a stem diameter of 2 ft. 6 in. Stem not buttressed. Bark grey, sometimes finely wrinkled or fissured longitudinally, slightly rough with small longitudinally elongated pustules ; when cut, cream-coloured or white streaked with yellow ; measuring $\frac{1}{2}$–$\frac{3}{4}$ in. thick on a tree with a stem diameter of 2 ft. 2 in. The fresh bark has a very faint odour of celery. Sapwood almost white, fairly soft ; the split surface has a silk-like sheen. Branches of inflorescence clothed with a close felt of minute hairs, otherwise all parts of the tree are almost hairless. Green leaves when crushed have an odour of celery. Leaves large and compound (pinnate or bipinnate), alternate, consisting of leaflets arranged on a main axis and often (when bipinnate) of leaflets arranged on lateral axes branching from the main axis. The leaf-axes are constricted (articulate) where they are joined by branches and stalklets of the leaflets. The leaf-axes contain a large amount of pith. Each leaflet has the appearance of an ordinary leaf and is borne on a stalklet $\frac{1}{6}$–$\frac{1}{2}$ in. long. The blades of the leaflets are egg-shaped or narrowly egg-shaped in outline, abruptly drawn out into a decided point at the apex, midrib and lateral nerves visible on both surfaces ; measurement

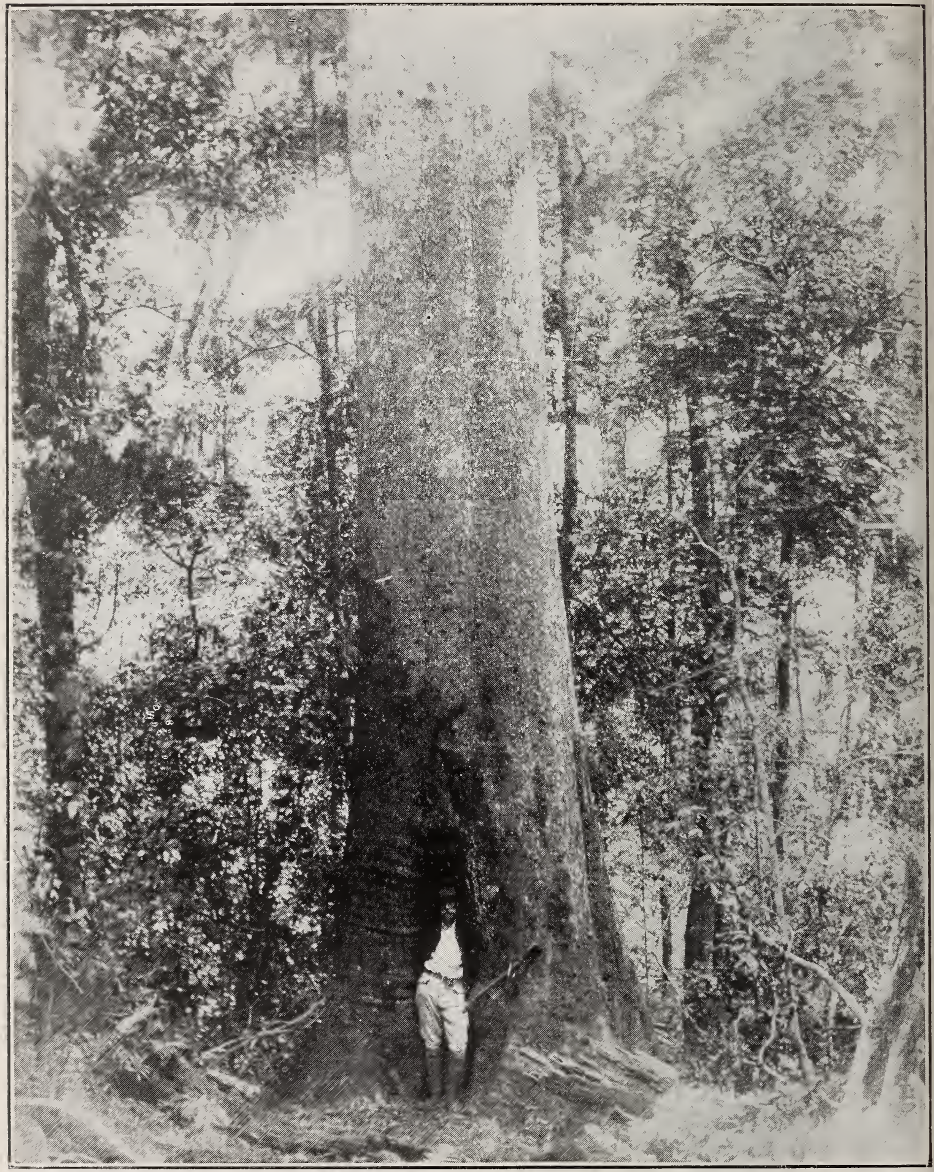


Fig. 202.—Brush Box (*Tristania conferta*). Roberts Plateau, Macpherson Range, about 28.3° S. The somewhat scaly or flaky bark of the lower part of the stem is indicated. This is a large example of the species. A portion of the stem of this tree is shown on the extreme left of Fig. 204.

(*Photo.: W. D. F.*)

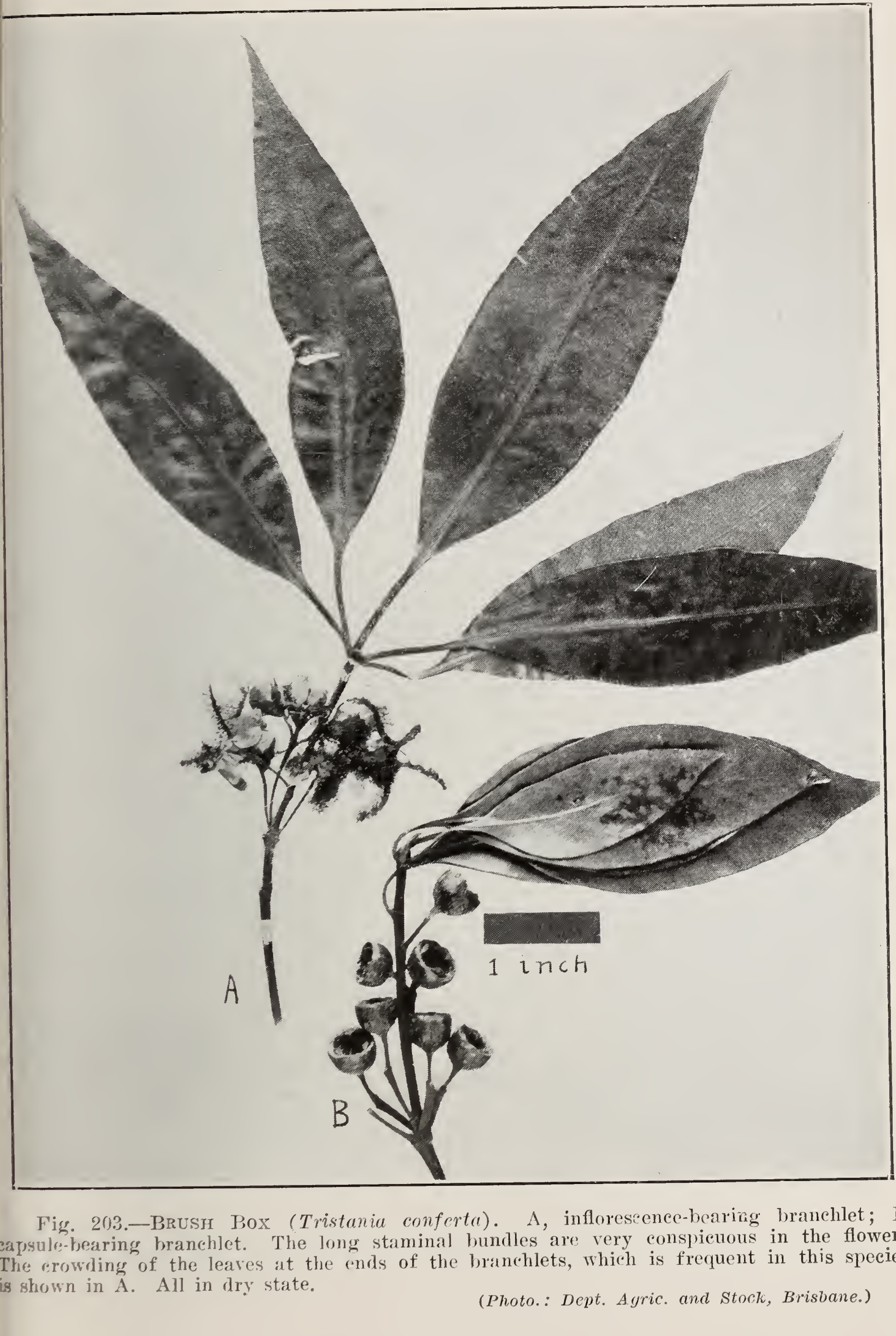


Fig. 203.—Brush Box (*Tristania conferta*). A, inflorescence-bearing branchlet; B, capsule-bearing branchlet. The long staminal bundles are very conspicuous in the flowers. The crowding of the leaves at the ends of the branchlets, which is frequent in this species, is shown in A. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

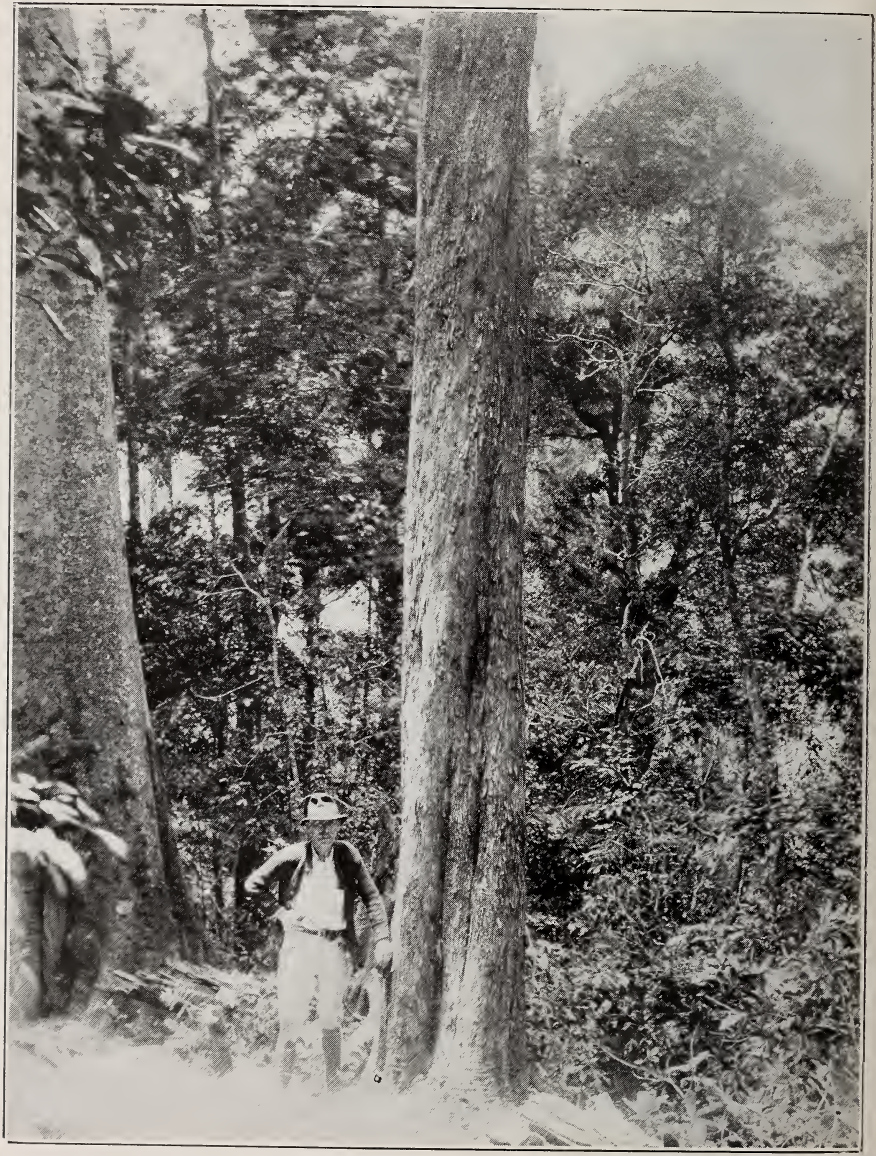


Fig. 204.—A Water Gum (*Tristania laurina*). Roberts Plateau, Macpherson Range about 28.3° S. The narrow or oblong flakes of partly shed bark are shown. On extreme left is part of the stem of the tree (*Tristania conferta*) shown in Fig. 202.

(*Photo.: W. D. F.*)

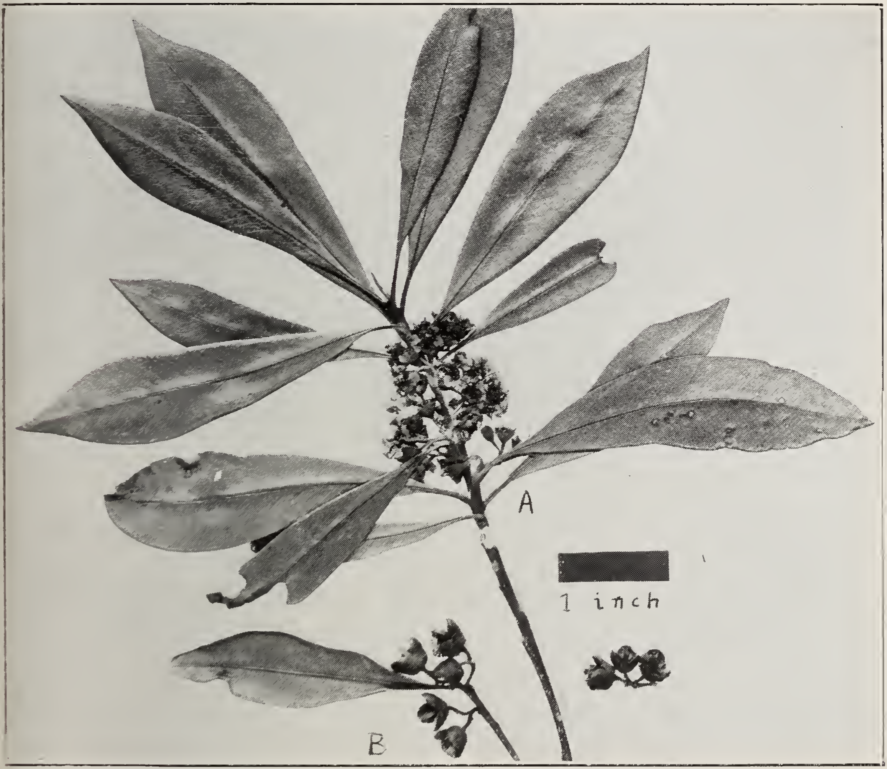


Fig. 205.—A Water Gum (*Tristania laurina*). A, inflorescence-bearing branchlet; B, capsule-bearing twig. Capsules are also shown below the inch scale. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

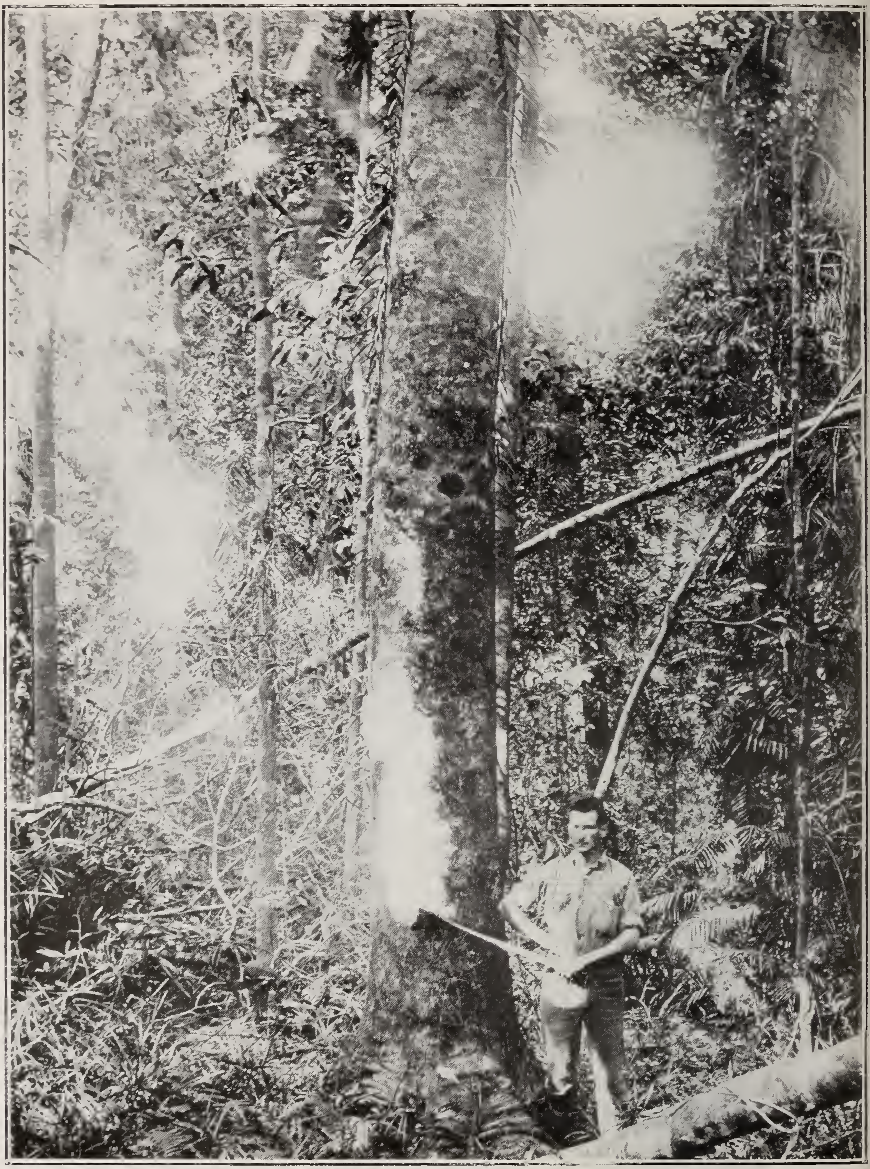


Fig. 206.—Celery-wood (*Panax elegans*). Eungella Range, about 21° S., altitude about 2,400 ft. The fine longitudinal wrinkles or small fissures, which are often seen in the bark of this species, are plainer in the upper part of the picture. The Pandanaceous climber (*Freycinetia excelsa*) is shown on the stem in the upper part, especially on the right; it is less conspicuous on the left. To the right of the figure the leaves of the common Lawyer Palm of the Eungella Range (*Calamus australis*) are shown.

(*Photo.: W. D. F.*)

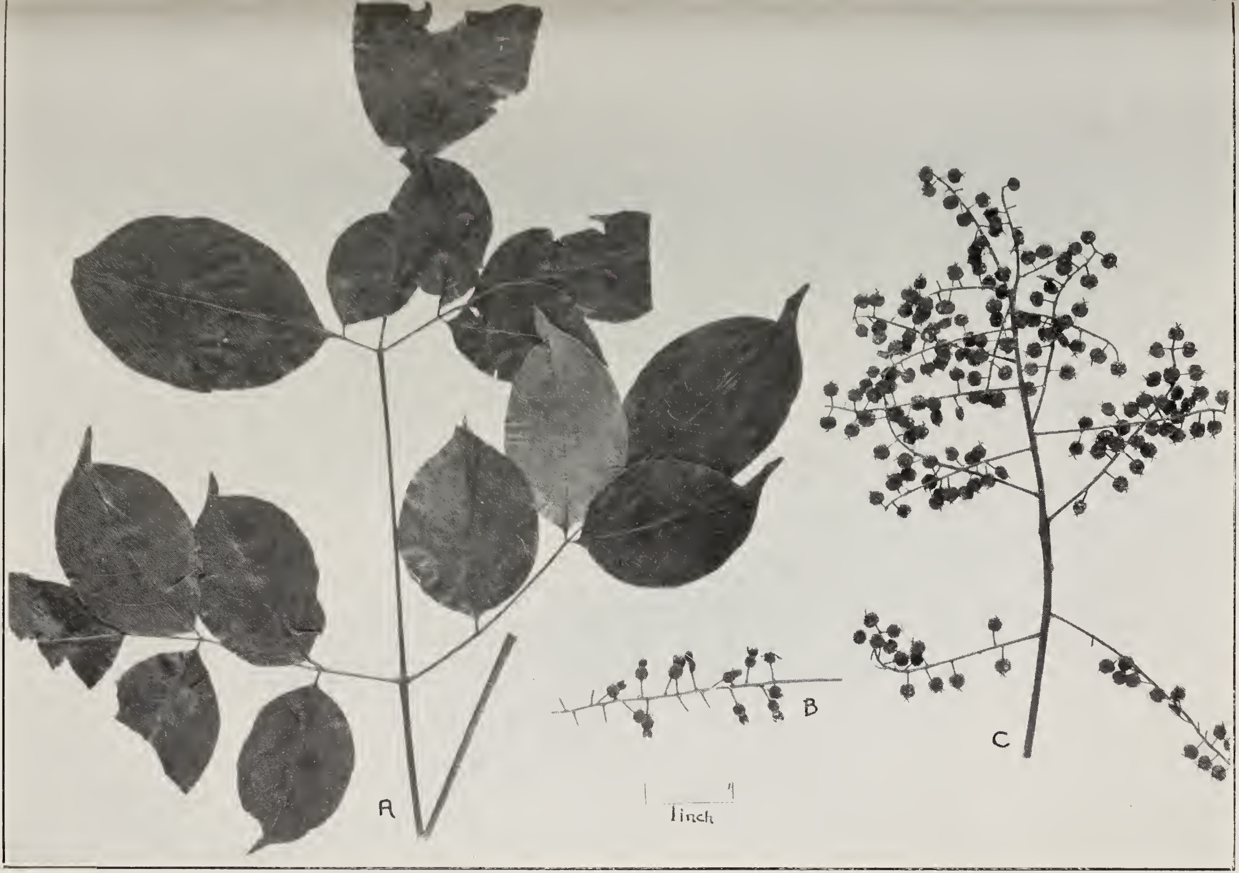


Fig. 207.—Celery-wood (*Panax elegans*). A, end portion of leaf; B, part of inflorescence; C, part of inflorescence which has attained fruiting stage. All in dry state.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

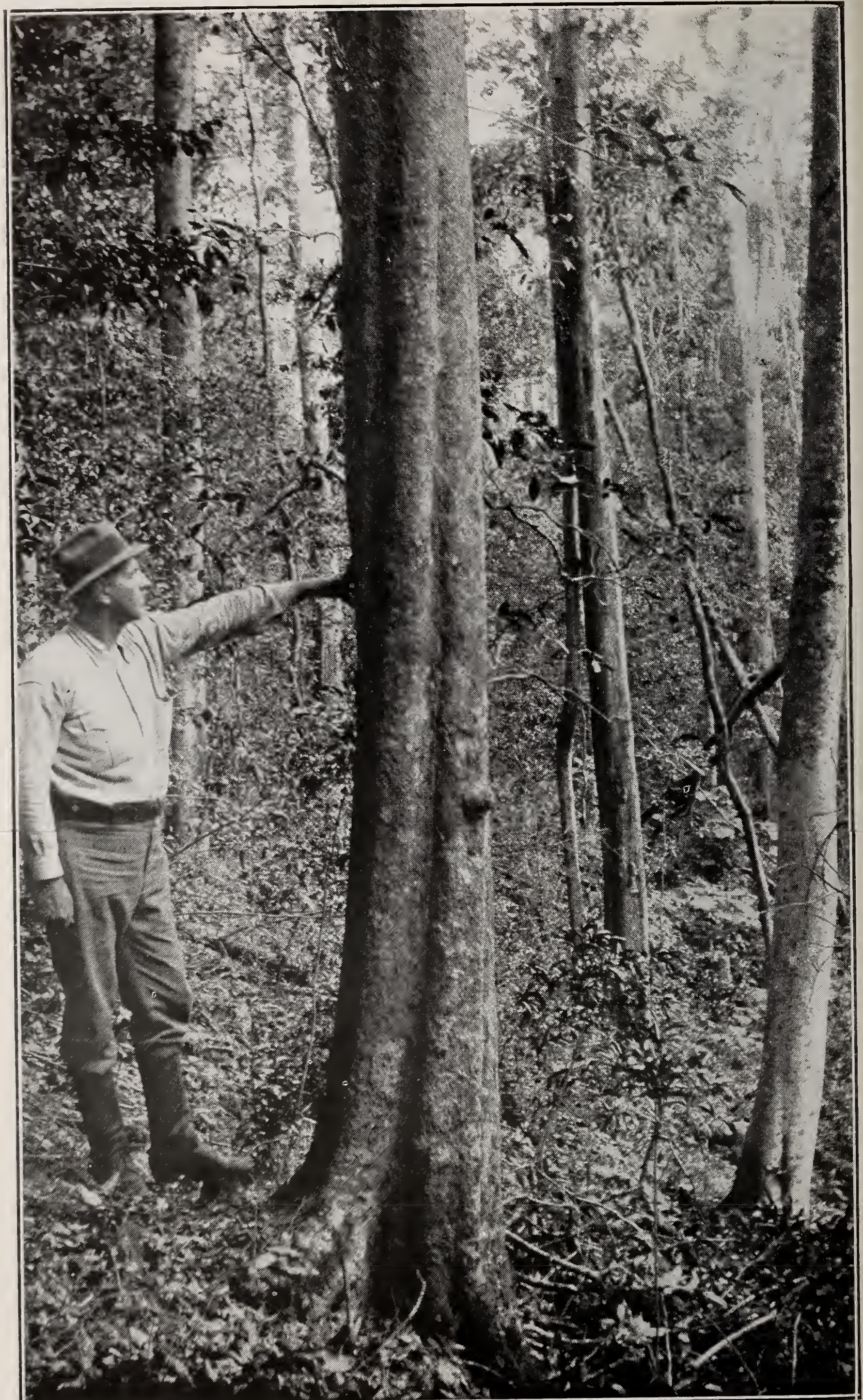


Fig. 208.—Lucuma Amorphosperma. Imbil, about 26.4° S. The slight, rounded depressions of the bark are shown. The tree on extreme right is *Endiandra compressa.* (*Photo.: W. D. F.*)

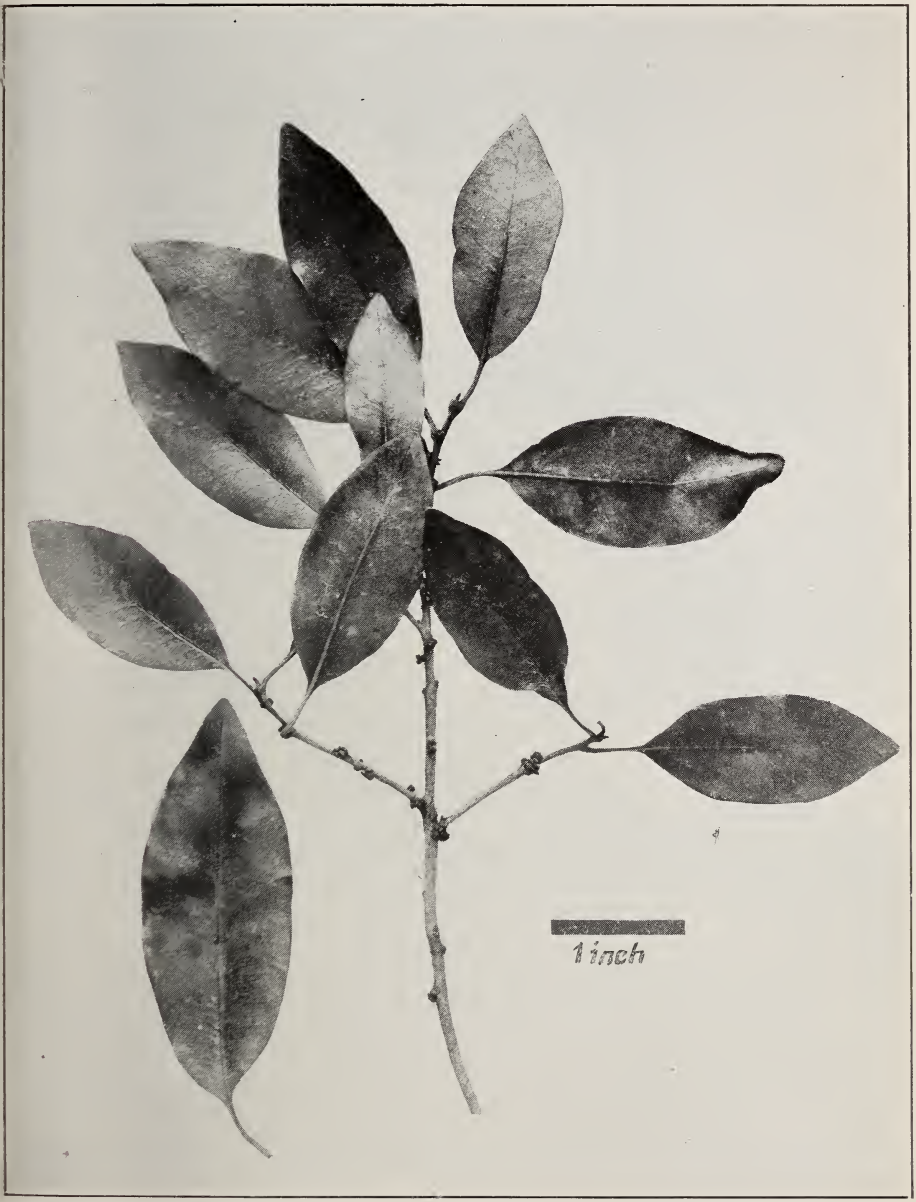


Fig. 209.—LUCUMA AMCRPHOSPERMA. The small groups or clusters of immature flowers are shown on the branchlets. Dry material.

(Photo.: Dept. Agric. and Stock, Brisbane.)

of leaflet blades, 2–5 in. long, 2–$2\frac{1}{2}$ times as long as broad. Flowers in a large much-branched inflorescence (panicle with raceme-like ultimate branches). Stalklets of individual flowers $\frac{1}{8}$–$\frac{1}{6}$ in. long. The lowermost part of the flower, the combined calyx and ovary, is round or egg-shaped, flattened (compressed), $\frac{1}{6}$–$\frac{1}{8}$ in. broad. The apex of the combined calyx and ovary bears 5 petals, each petal egg-shaped in outline $\frac{1}{12}$–$\frac{1}{8}$ in. long and with an inflexed tip and a raised line on the upper or inner side. Alternating with the petals and about as long as them are 5 stamens with anthers $\frac{1}{12}$ in. long and very short filaments attached at the back of the anthers. In the centre of the flower are two united styles, about $\frac{1}{24}$ in. long, arising from the ovary. The ovary contains 2 cells. Fruit circular or broader than long, flattened (compressed), about $\frac{1}{4}$ in. wide, containing 2 cells, each cell containing a seed. Each fruit generally bears 2 curved styles at its apex. Flowering period irregular. Flowering specimens have been gathered in March and June; fruiting specimens also have been collected in March and June.

Distribution.—Coastal scrubs from Illawarra, N.S.W. (J. H. Maiden), to Cairns North Queensland.

References.—*Panax elegans* C. Moore and F.v.M., in Transactions of Philosophical Institute of Victoria, vol. 2, p. 68, 1858; *Tieghemopanax elegans* R. Viguier in Bull. Soc. Bot., 52, 305; *Polyscias elegans* Harms in Engler & Prantl Naturl. Pflanzfamilien, 3, 8, p. 45, 1894.

Family CORNACEAE.

Marlea vitiensis Benth. (*Alangium vitiense* Baill.). Muskwood, Black Muskheart. Up to 40 ft. high and 9 in. stem diameter. Sapwood yellowish. Young shoots and sometimes underside of leaves hairy. Leaves alternate; stalks $\frac{1}{8}$–$\frac{1}{2}$ in.; blades very unequal-sided, venation very prominent below, the larger net-veins at right angles to midrib and lateral nerves, drawn out into point at apex, 3–5 in. long, 2–3 times as long as broad. Fruit oval, $\frac{1}{2}$–$\frac{3}{4}$ in. long, fleshy, bearing remains of perianth at apex, containing a single egg-shaped seed about $\frac{3}{8}$ in. long. (Var. *tomentosa* Benth. Branchlets, undersides of leaves, and flowers softly hairy.)—Clarence River (Benth.) to Atherton; Pacific Ids. (Benth.).

Family SAPOTACEAE.

Corolla without scales or staminodia between its lobes	1. *Chrysophyllum.*
Corolla with staminodia or scales alternating with the corolla lobes and stamens.	
Flowers mostly stalkless	2. *Lucuma.*
Flowers mostly stalked	3. *Sideroxylon.*
Ovary surrounded by a hirsute disk	4. *Hormogyne.*

1. CHRYSOPHYLLUM.

Chrysophyllum pruniferum F.v.M. (*Niemeyera prunifera* F.v.M.). Small tree. Leaves alternate: stalks $\frac{1}{4}$–$\frac{1}{2}$ in.; blades rusty-hairy and strongly veined beneath, drawn out or tapering into point at apex, 4–$5\frac{1}{2}$ in. long, $2\frac{1}{2}$–3 times as long as broad. Fruit globular, dark blue, fleshy, $1\frac{1}{4}$–2 in. in diameter, containing a large globular seed 1–$1\frac{1}{2}$ in. in diameter with a smooth scar (hilum) up to 1 in. long and $\frac{1}{2}$ in. broad.—Bellinger River to Rockingham Bay (Benth.)

2. LUCUMA.

Lucuma Amorphosperma. Brown Pearwood, Silky Hornbeam. Figs. 208 and 209.

Description.—A tree attaining 60 ft. in height and 20 in. stem diameter. Stem not buttressed. Bark greyish brown, not scaly but marked by rounded depressions; when cut, exuding milky juice, bright red, becoming paler inwards, $\frac{3}{10}$ in. thick on a tree 20 in. stem diameter. Leaves alternate; stalks $\frac{1}{4}$–$\frac{3}{4}$ in. long; blades egg-shaped or lance-shaped in outline, rounded, blunt or pointed at apex, silky hairy or rusty hairy beneath, midrib and lateral nerves visible on both surfaces but somewhat plainer beneath; measurement of leaf-blade, 2–4 in. long, 2–3 times as long as broad. Flowers stalkless, in groups $\frac{1}{4}$–$\frac{3}{8}$ in. broad in the forks (axils) of lower leaves or on the branchlets. Individual flowers $\frac{1}{6}$–$\frac{1}{4}$ in. long; the outermost part, the calyx, cup-shaped, hairy, about $\frac{1}{12}$ in. long, consisting of 5 overlapping lobes, The corolla, on the inner side of the calyx, is tubular, hairy inside, and less than $\frac{1}{12}$ in. long at base; it is divided into 5 lobes about $\frac{1}{12}$ in. long at apex. Attached to the inner side of the corolla and each situated opposite to each corolla lobe are 5 stamens about $\frac{1}{12}$ in. long, the anthers being about $\frac{1}{24}$ in. long. The ovary, in the centre of the flower, is narrowly egg-shaped and covered with long hairs; it tapers at the apex into a hairless style almost $\frac{1}{12}$ in. long. Fruit globular, black, $1\frac{1}{4}$–2 in. in diameter, fleshy outside, containing a single seed 1-$1\frac{3}{4}$ in. in diameter.

Distribution.—Limited to Australia. From Tweed River, N.S.W., to Mt. Dryander, near Bowen, Queensland (F.v.M.).

Uses.—The wood should be useful for indoor and cabinet work.

References.—Lucuma Amorphosperma Bentham and Hooker, Genera Plantarum, vol. 2, p. 654, 1874 ; *Amorphospermum antilogum* F.v.M., Fragmenta Phytographiae Australiae, 7, p. 113.

Lucuma chartacea F. M. Bailey. Small tree. Leaves alternate ; stalks $\frac{1}{8}$–$\frac{3}{8}$ in. ; blades reversed lance-shaped often broadest towards apex, drawn out into point at apex, gradually narrowed towards base, venation very prominent beneath, 3–6 in. long, 3–4 times as long as broad. Flowers stalkless, in groups in the forks (axils) of the leaves or on the branchlets. Fruit almost stalkless, egg-shaped, described as purple, 1–1$\frac{1}{4}$ in. long, containing 1 or 2 large seeds almost 1 in. long.—Palmwoods to Innisfail.

3. SIDEROXYLON.

Sideroxylon Pohlmanianum Benth. and Hook. Engraver's Wood, Yellow Boxwood. Figs. 210 and 211.

Description.—Attaining 70 ft. in height and 21 in. stem diameter. Stem not buttressed. Bark grey, somewhat scaly ; when cut, light brown, reddish brown towards sapwood, exuding milky juice, $\frac{3}{8}$ in. thick on a tree with stem 21 in. in diameter ; surface of sapwood yellow or light brown. Young shoots silky hairy. Leaves alternate ; stalks $\frac{3}{8}$–$\frac{7}{8}$ in. ; blades reversed lance-shaped, blunt or rounded at apex, narrowed at base, broader towards apex, venation visible on both surfaces, 3–6 in. long, 2$\frac{1}{2}$–4 times as long as broad. Flowers in groups of 4–12 in forks (axils) of the leaves, each flower on stalk about $\frac{1}{12}$ in. long. Outermost part of flower, the calyx, consists of 5 hairy, concave, broad, overlapping lobes $\frac{1}{8}$ in. long. On the inner side of the calyx is the corolla, which is $\frac{1}{12}$–$\frac{1}{8}$ in. long and divided at apex into 5 lobes. Stamens eaten by insects in flowers examined. Ovary, in centre of flower, egg-shaped, surrounded at base by long, dense, brownish hairs. Fruit globular, about 1 in. in diameter, containing 5–3 seeds. Seeds hard, glossy, brown, flattened (compressed), $\frac{1}{2}$ in. long, scar on inner angle $\frac{3}{8}$ in. long. Fruiting in October.

Distribution.—Tweed River, N.S.W. (R. T. Baker), to Atherton, North Queensland.

Uses.—The wood should be useful for cabinet-work and indoor fittings.

Synonyms.—Achras Pohlmaniana F.v.M., *Sapota Pohlmaniana* F.v.M.

Reference.—Sideroxylon Pohlmanianum, Bentham and Hooker, Genera Plantarum, ii., p. 655, 1876.

Sideroxylon Richardi F.v.M. Coondoo. The common name adopted here is used in parts of the Wide Bay district and is applied to the tree because it is plentiful on Mt. Coondoo. It is also known as Sweetbark in allusion to its sweet astringent bark. Blush Coondoo. Figs. 212 and 213.

Derivation.—Sideroxylon from Greek *sideros*, iron ; *xylon*, wood (alluding to the hard wood of some species) ; Richardi, after A. Richard.

Description.—A tree attaining 130 ft. in height and a stem diameter of about 3 ft. Stem sometimes slightly flanged at the base. Bark brown, rather rough and somewhat scaly, shed in large irregular pieces ; when cut, dark red and exuding a milky juice ; measuring $\frac{3}{8}$ in. thick on a tree with a stem diameter of 2 ft. Young shoots and parts of the flowers covered with fine hairs. Branchlets fairly thick. Leaf-stalks $\frac{3}{8}$–1 in. long. Leaves alternate, mostly crowded towards the ends of the branchlets, oval or elliptical, rounded, obtuse, or occasionally drawn out into a point at the apex, especially in Northern specimens, midrib and sometimes the lateral nerves visible on the upper surface, but both are more prominent on the underside, where also numerous and fine net-veins are often prominent ; measurement of leaf-blade, 2$\frac{1}{2}$–5$\frac{1}{2}$ in. long, 2–3 times as long as broad. Flowers in clusters of 2–7 (seldom reduced to 1) in the forks of the leaves. Stalks of individual flowers $\frac{1}{5}$–$\frac{1}{2}$ in. long. Each flower measures about $\frac{1}{5}$ in. long ; the outer part, the calyx, consists of 5 broadly oval or nearly round lobes, which are sometimes finely hairy and measure about $\frac{1}{8}$ in. long ; generally there are 3 outer lobes overlapping 2 inner ones. On the inner side of the calyx is the corolla (the combined petals) which is broadly cylindrical or cup-shaped, measures about $\frac{1}{5}$ in. in length, and is divided to about the middle into 5 lobes. Stamens 5, included in the corolla, each stamen situated about or below the middle of each corolla lobe. Alternating with the stamens are 5 slender staminodia (undeveloped stamens). Ovary (in the centre of the flower) egg-shaped, often covered with very fine down, generally 5- or 4-celled, tapering into a hairless style about $\frac{1}{10}$ in. long. Fruit narrowly oval, black when ripe, surmounted by the short persistent style, about $\frac{3}{4}$ in. long, the outer fleshy part enclosing 1 or sometimes 2 seeds. Seeds brown, smooth and shining, narrowly oval, about $\frac{1}{2}$ in. long, the scar (hilum) narrow and more than half the length of the seed.

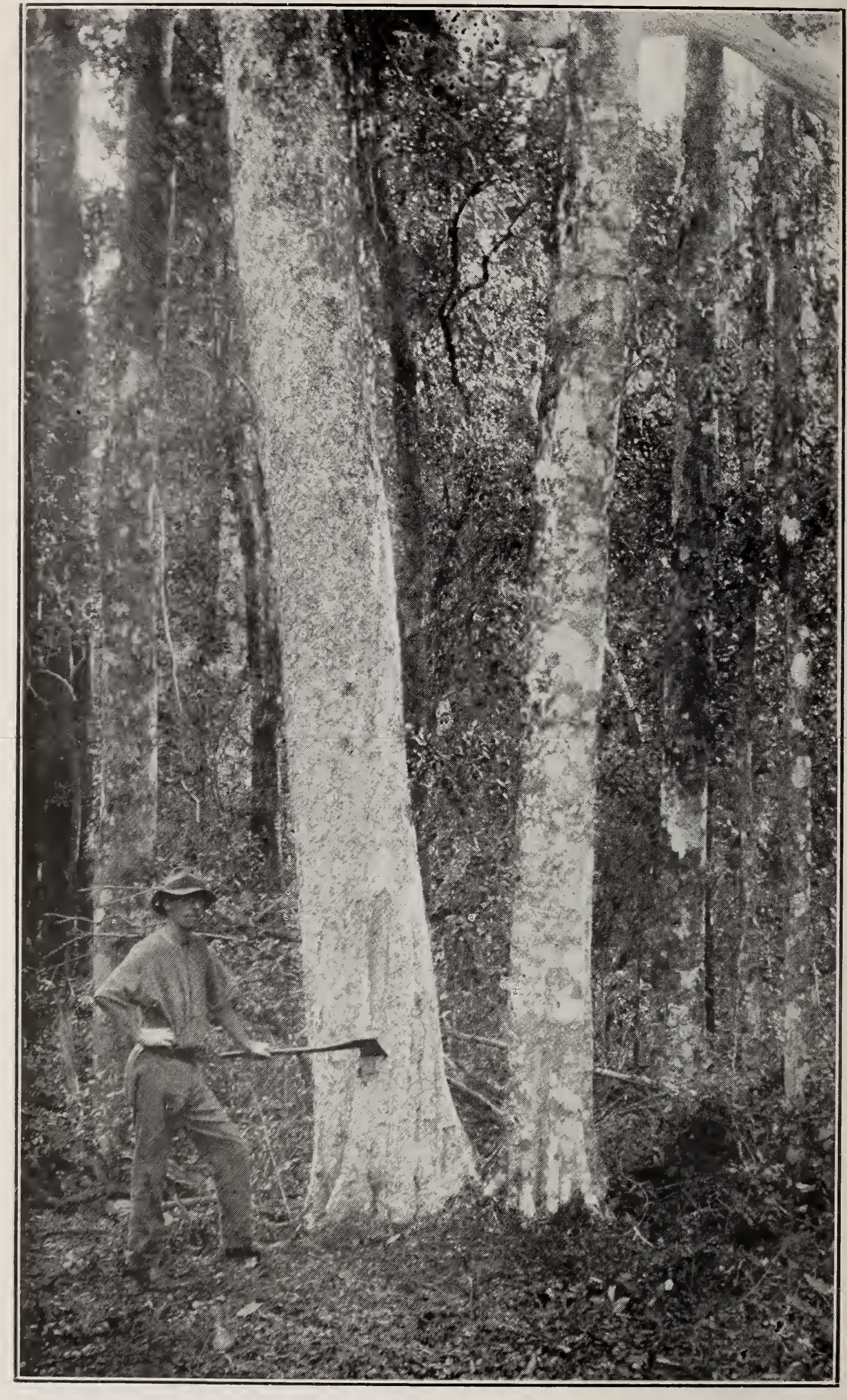


Fig. 210.—Sideroxylon Pohlmanianum, the large tree on left; to the right of it is an example of *Cupaniopsis anacardioides* var. *parvifolia*. Nanango, about 26.6° S.

(*Photo.: W. D. F.*)

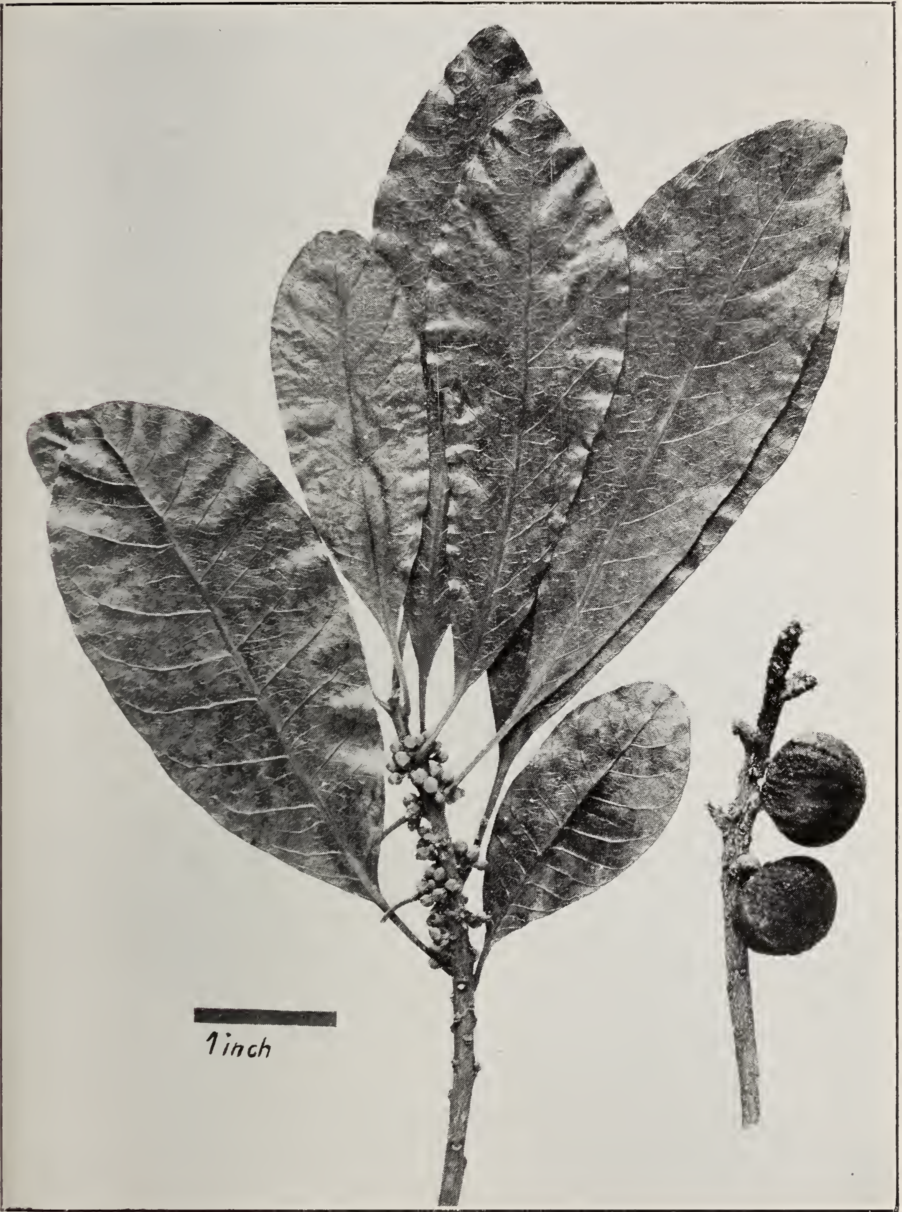


Fig. 211.—Sideroxylon Pohlmanianum. Inflorescence-bearing branchlet. The groups of flowers on the branchlet and often in the forks of the leaves are shown. Fruit-bearing branchlet on right. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

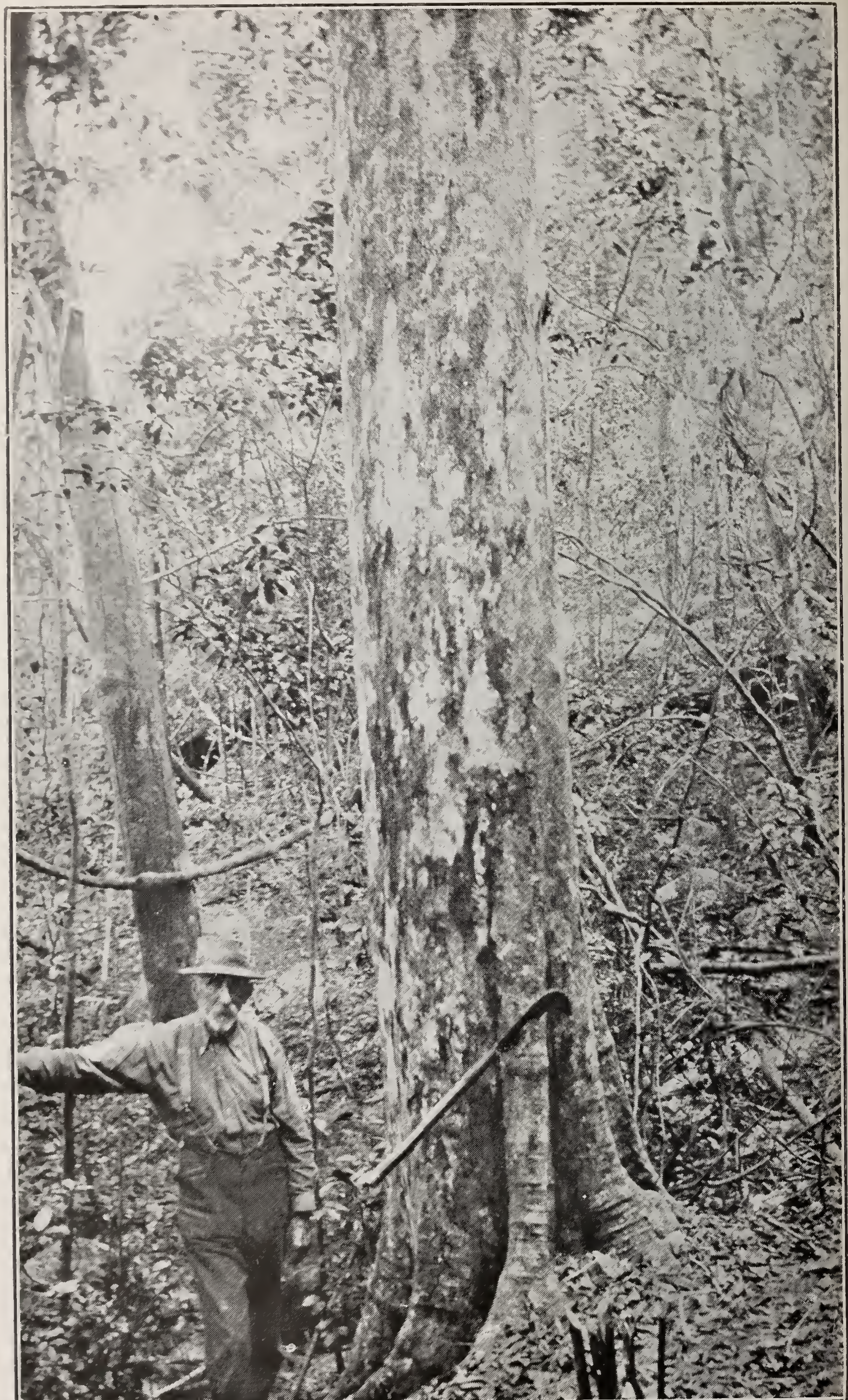


Fig. 212.—Coondoo (*Sideroxylon Richardi*). The irregular patches left by shed bark are shown. In the uneven surface of the bark and the shape of the stem towards the roots this example is similar to the example of *Lucuma Amorphosperma* shown in Fig. 208. Peculiarities such as these, although difficult to define, are often the signs by which the field botanist recognises species or groups of related species.

(*Photo.: W. D. F.*)

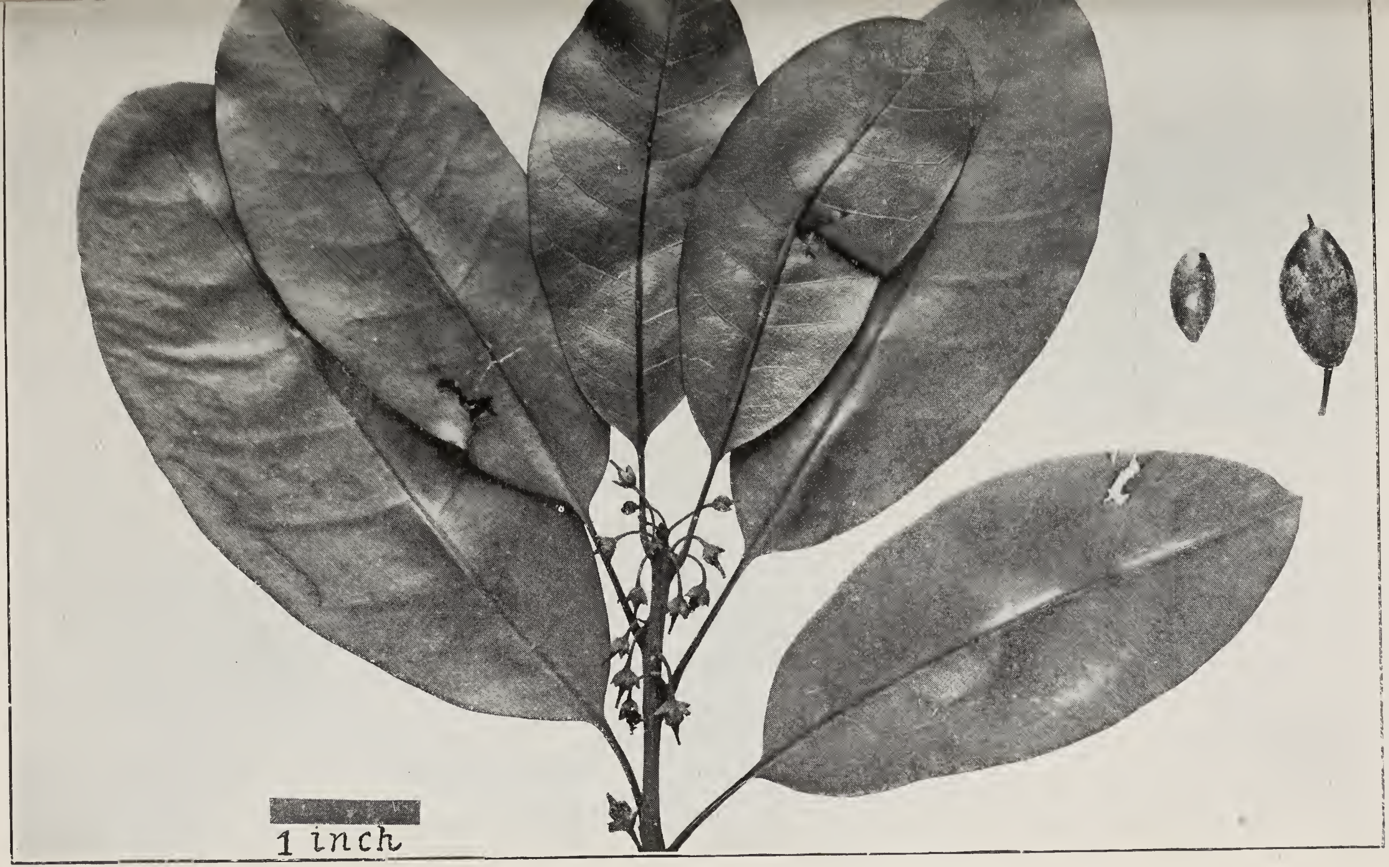


Fig. 213.—COONDOO (*Sideroxylon Richardi*). Flower-bearing branchlet in dry state. The groups or clusters of flowers situated in the forks of the leaves are shown. Fruit and seed on right. Branchlet to scale. Fruit and seed about natural size.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

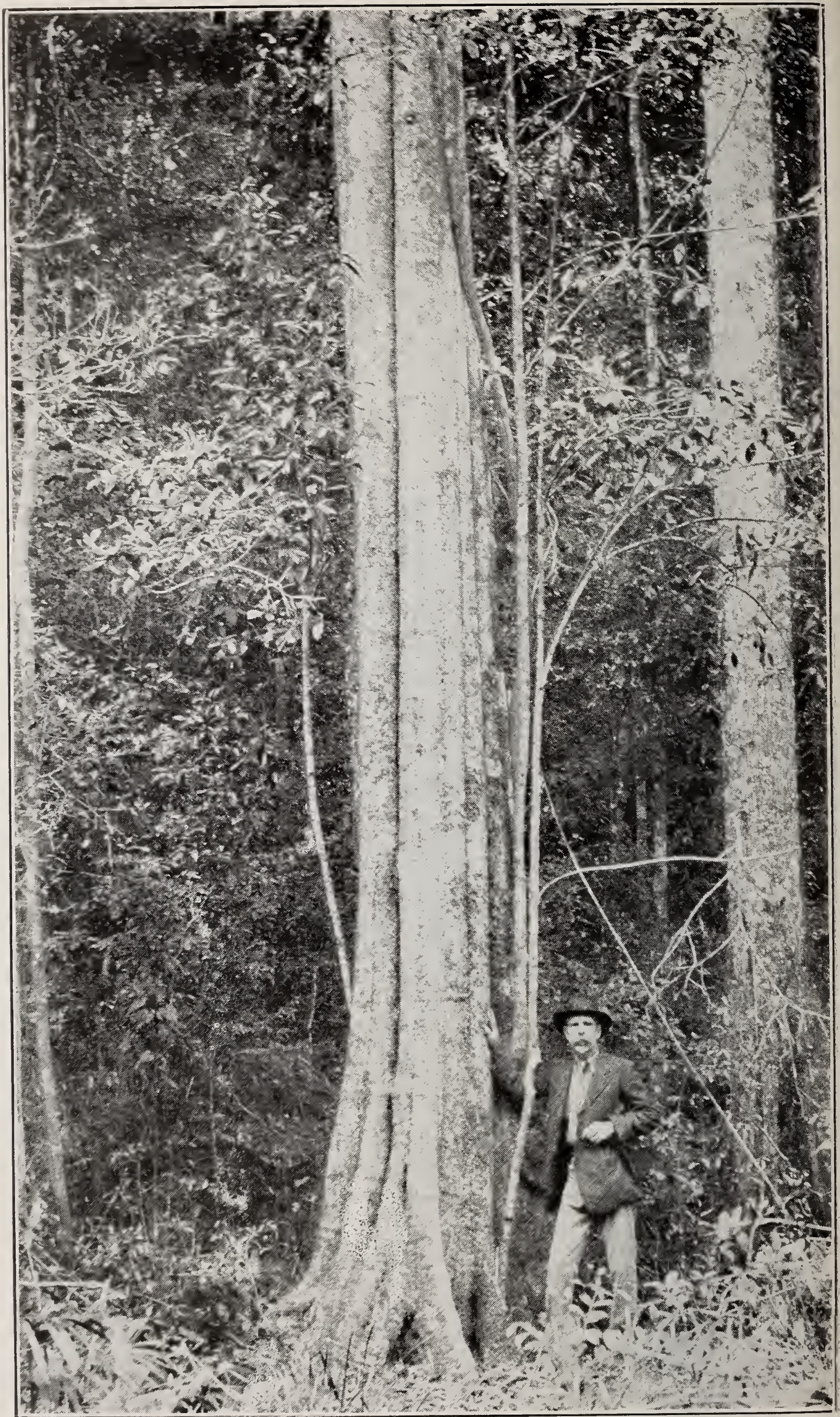


Fig. 214.—Black Apple (*Sideroxylon australe*). Tambourine Mountain, about 28° S. The channelled stem, which often characterises this species, is shown.

(*Photo.: W. D. F.*)

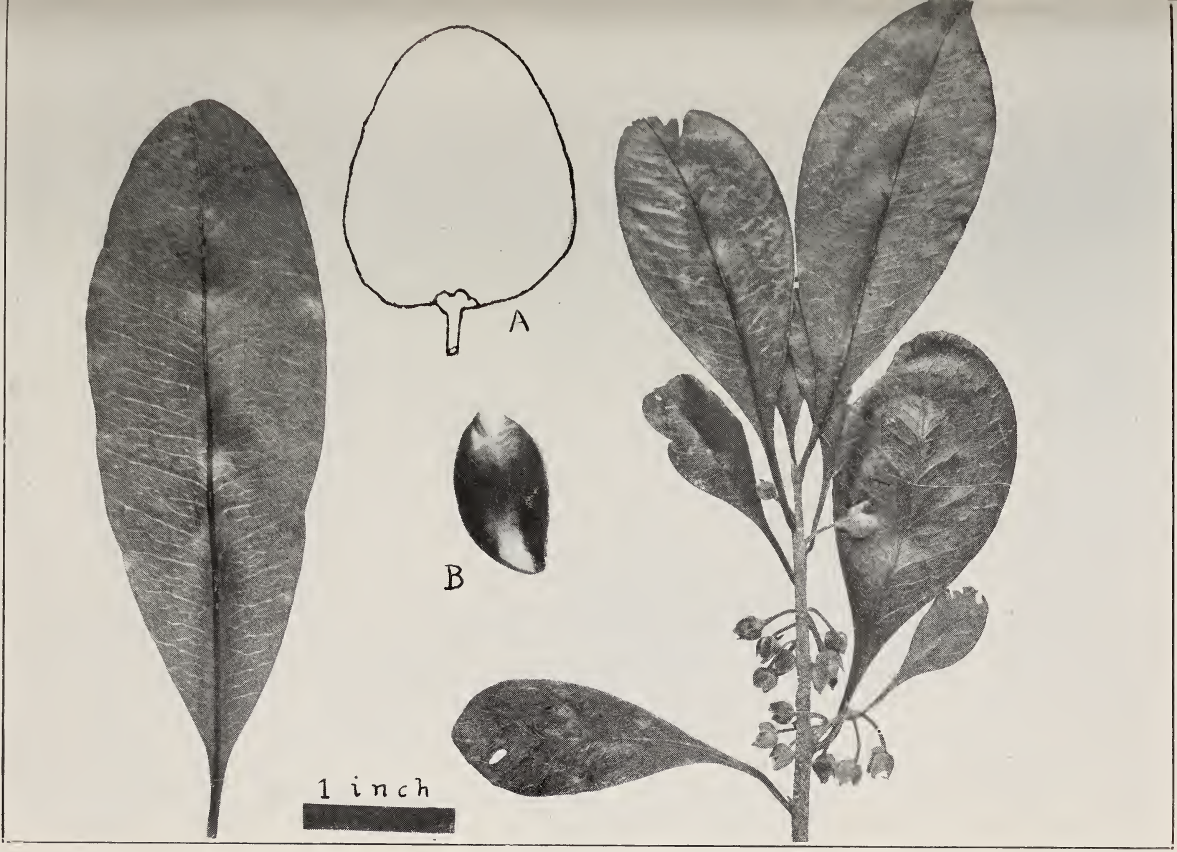


Fig. 215.—Black Apple (*Sideroxylon australe*). Flower-bearing branchlet on right. Leaf showing underside on left. A, outline of fruit; B, seed. All in dry state, except A, and all figures to inch scale.

(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Distribution.—Scrubs of the coastal area of Queensland from the Tweed River in the south to the Barron River in the north. N. S. Wales as far south as Illawarra (Benth.).

Uses.—The timber should be useful for cabinet-making and general indoor work. F. M. Bailey in his Comprehensive Catalogue of Queensland Plants, p. 305, quotes Dr. Jos. Bancroft to the effect that "the sweet astringent bark might be useful in throat diseases."

References.—*Sideroxylon Richardi* F.v.M. in Systematic Census of Australian Plants, p. 92, 1882 ; *Achras laurifolia* F.v.M., in Bentham's Flora Australiensis, vol. iv., p. 282, 1869 ; *Sideroxylon laurifolium* (Rich.) Benth. and Hook. in Genera Plantarum, vol. 2, p. 656, 1876.

Sideroxylon australe Benth. & Hook. Black Apple, Wild Plum, Yellow Bulletwood. Figs. 214 and 215.

Derivation.—Sideroxylon from Greek *sideros*, iron ; *xylon*, wood ; Latin *australe*, southern.

Description.—A tree attaining 100 ft. in height and a stem diameter of 2 ft. Stem sometimes with small flanges at the base and often channelled or fluted for some distance upwards. Bark rough, sometimes slightly longitudinally furrowed ; when cut it exudes a milky juice which is not so copious as in some of the other Sideroxylons. Very young shoots and parts of the flowers hairy. Leaf-stalks $\frac{1}{6}$ to nearly $\frac{1}{2}$ in. long. Leaves alternate, elliptical, apex rounded or drawn out into a blunt or fine point, gradually tapering towards the base into the stalk, firm in texture ; midrib, lateral nerves, and net-veins visible on both surfaces and often plainer on the underside ; measurement of leaf-blade $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, $2\frac{1}{3}$–3 times as long as broad. Flowers in clusters of 2–6 (rarely reduced to 1) in the forks of the leaves. Each flower is borne on a stalk varying $\frac{1}{6}$–$\frac{3}{8}$ in. long, the flower itself measuring about $\frac{1}{4}$ in. in length. The calyx, the outermost part of the flower, consists of 5 lobes broadly egg-shaped in outline measuring about $\frac{1}{6}$ in. long, 3 outer lobes overlapping 2 inner ones. Occasionally there are fine hairs on the calyx lobes, especially on the inner ones. On the inner side of the calyx is the corolla (the combined petals), which is broadly cylindrical, measures nearly $\frac{1}{4}$ in. long, and is divided to about the middle into 5 lobes. Stamens 5, included in the corolla and inserted near its base, each stamen being situated about or below the middle of each corolla lobe. Alternating with the stamens are 5 slender staminodia (undeveloped stamens). The ovary (in the centre of the flower) is almost broadly conical in shape, is densely hairy, contains 5 cells, and tapers into a slender style about $\frac{1}{6}$ in. long. The fruit is black and plum-like in shape, is often a little longer than broad, measures $1\frac{1}{4}$–2 in. in diameter, and contains 3–5 seeds. Seeds elliptical in shape, about 1 in. long and $\frac{1}{2}$ in. broad, flattened, with a very hard, glossy-brown coat and a long scar running the full length of the seed on the inner edge. Flowering period : December.

Distribution.—Coastal scrubs from Illawarra, N.S.W. (Benth.), to Rockingham Bay, Queensland (Benth.).

Uses.—The timber should be useful for cabinet-making and general indoor work Mr. R. T. Baker highly recommends it for wood-carving. The glossy seeds are sometimes perforated at each end and made into necklaces.

References.—*Sideroxylon australe* Bentham and Hooker, Genera Plantarum, vol. ii., p. 656, 1876 ; *Achras australis* R. Brown, Prodromus, 530.

Sideroxylon chartaceum Benth. & Hook. (*Achras chartacea* F.v.M.). Flowering when small tree about 15 ft. high. Leaves alternate ; stalks $\frac{3}{8}$–$\frac{5}{8}$ in. ; blades reversed lance-shaped, pointed at apex, gradually narrowed at base, often broadest in upper part, venation visible on both surfaces, $2\frac{1}{2}$–8 in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ times as long as broad. Fruit-stalks about $\frac{1}{4}$ in. long ; fruit egg-shaped, globose or oval, $\frac{5}{8}$–$\frac{3}{4}$ in. long, containing 2–5 brown, glossy, hard seeds $\frac{1}{2}$ in. long ; scar of seed at inner angle, very narrow, about $\frac{1}{4}$ in. long.—Richmond River, N.S.W. (Maid. & Betche) to Johnstone River, Queensland.

Sideroxylon eerwah F. M. Bailey. Described as medium- or large-sized tree. Leaves alternate ; stalks $\frac{1}{4}$–$\frac{1}{2}$ in. ; blades reversed egg-shaped in outline, round or blunt-pointed at apex, gradually narrowed at base, often broadest in upper part, venation not very prominent, 2–$3\frac{1}{2}$ in. long, 2–3 times as long as broad. Fruit-stalks $\frac{3}{8}$–$\frac{1}{2}$ in. ; fruit oval or globose, described as reddish purple, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, containing 1–3 pale-brown, glossy, egg-shaped, pointed seeds $\frac{3}{4}$–$1\frac{1}{4}$ in. long ; scar of seed at inner angle, as long as seed and $\frac{1}{5}$ in. wide.—Eumundi, Queensland.

Sideroxylon myrsinoides Benth. & Hook. (*Achras myrsinoides* A. Cunn.). Small tree. Bark with milky juice. Branchlets and often underside of leaves silky hairy.

Leaves alternate; stalks $\frac{1}{8}$–$\frac{1}{4}$ in.; blades egg-shaped or elliptical in outline, bluntly pointed or rounded at apex, venation more prominent beneath, $1\frac{1}{4}$–3 in. long, 2–3 times as long as broad. Flowers in clusters in leaf-forks or scattered on branchlets; stalks silky, $\frac{1}{5}$–$\frac{3}{10}$ in. long; flowers silky, about $\frac{1}{6}$ in. long, style protruding $\frac{1}{12}$ in. beyond flower. Fruit not available.—Northern N. S. Wales (Moore) to Bundaberg.

4. HORMOGYNE.

Hormogyne cotinifolia A. DC. Small tree. Leaves alternate; stalks about $\frac{1}{24}$ in.; blades reversed egg-shaped in outline, round or blunt at apex, often narrowed at base, $\frac{1}{2}$–$1\frac{3}{8}$ in. long, from as long as broad to twice as long as broad. Flowers mostly single in forks of leaves, stalks $\frac{1}{5}$–$\frac{3}{8}$ in. long. Fruit green (possibly immature) oval, scarcely fleshy, $\frac{1}{2}$ in. long, containing 1–3 smooth, shining seeds almost as long as fruit; scar of seed narrow, almost as long as seed.—Liverpool Plains (Benth.) to Rockhampton.

Family EBENACEAE.

Calyx lobes and corolla lobes 4–6	1. *Diospyros.*
Calyx lobes, corolla lobes, and ovary cells usually 3	2. *Maba.*

1. DIOSPYROS.

Diospyros mabacea F.v.M. (*Cargillia mabacea* F.v.M.). Described as tree about 20 ft. In absence of specimens the following description is adapted from Bentham (Fl. Austr.):—Leaves elliptical, drawn out into short point at apex, 3–4 in. long, veins prominent beneath. Male flowers with 4 calyx and corolla lobes, the flowers in stalkless clusters; calyx $\frac{1}{8}$ in. long, the lobes shorter than the tube. Corolla silky hairy, nearly twice as long as calyx. Stamens about 15. Fruit described by C. Moore as scarlet berry.—Tweed River (Benth.).

Diospyros australis Benth. & Hook. (*Cargillia australis* R.Br.). Up to 20 ft. high. Leaves alternate; stalks $\frac{1}{5}$–$\frac{1}{4}$ in.; blades elliptical, round or blunt at apex, often narrowed at base, venation faintly visible above, mostly obscured below, pale yellow below, $1\frac{3}{4}$–$3\frac{1}{2}$ in. long, 2–3 times as long as broad. Fruit-stalks single in forks of leaves, $\frac{1}{12}$ in. long. Fruit oval, black, up to $\frac{3}{4}$ in. long, enclosed at base by cup-shaped 4- or 5-lobed calyx. Fruit containing 1 egg-shaped seed $\frac{3}{8}$ in. long.—Illawarra (Benth.) to Eungella Range (west of Mackay).

Diospyros pentamera F.v.M. Myrtle Ebony. This tree is also frequently called Myrtle or Black Myrtle by bushmen; botanically it is closely related to the Ebonies of commerce (*Diospyros* species). Grey Persimmon. Figs. 216 and 217.

Derivation.—Diospyros from Greek *Dios*, divine; *pyros*, a grain of wheat; it was imagined that the fruit of a European species produced oblivion when eaten; pentamera from Greek *pente*, five; *meros*, a part (alluding to the 5 lobes of the calyx and corolla).

Description.—A tree attaining a height of 130 ft. and a stem diameter of 2 ft. The trees are generally very tall and slender, and specimens as large as 2 ft. in stem diameter are not very common in South Queensland scrubs except in the Macpherson Range. Stem in large trees frequently grooved or channelled in the lower part. Bark dark brown or nearly black, fairly rough and often wrinkled and somewhat scaly; when cut, external layer dark brown or black, middle layer pinkish brown, innermost layer yellowish brown, the entire bark measuring $\frac{1}{4}$ in. thick on a tree with a stem diameter of 2 ft. Surface of sapwood white. Flowers and young shoots downy with light-brown hairs. Leaf-stalks $\frac{1}{10}$–$\frac{1}{5}$ in. long. Leaves alternate, elliptical in outline, shortly pointed at the apex, the midrib visible on both surfaces, a few lateral nerves and net-veins visible on the upper side, under side slightly yellow with obscure veins; measurement of leaf-blade, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, 2–3 times as long as broad. Flowers on short stalklets about $\frac{1}{16}$ in. long, single along the branchlets or in groups of 3 or 5. Male and female elements in separate flowers (unisexual), and probably the male and female flowers on separate trees (dioecious). The following description is of female flowers:—The outer part of the flower, the calyx, bell-shaped, about $\frac{1}{6}$ in. long, divided to about half its length into 5 triangular lobes. Within the calyx is the corolla measuring about $\frac{1}{8}$ in. long and consisting of 5 petals, egg-shaped in outline, and united at the base. Within the corolla and attached to its base are 10 barren stamens about $\frac{1}{12}$ in. long, the upper parts of which (the anthers) are covered with rather long silky hairs. The ovary is in the centre of the flower; it is round or nearly globular, more or less covered with silky hairs, and is surmounted by a short style which is slightly lobed at the top. We have no male flowers for description. Bentham in his "Flora Australiensis" describes them as in clusters of 3 or

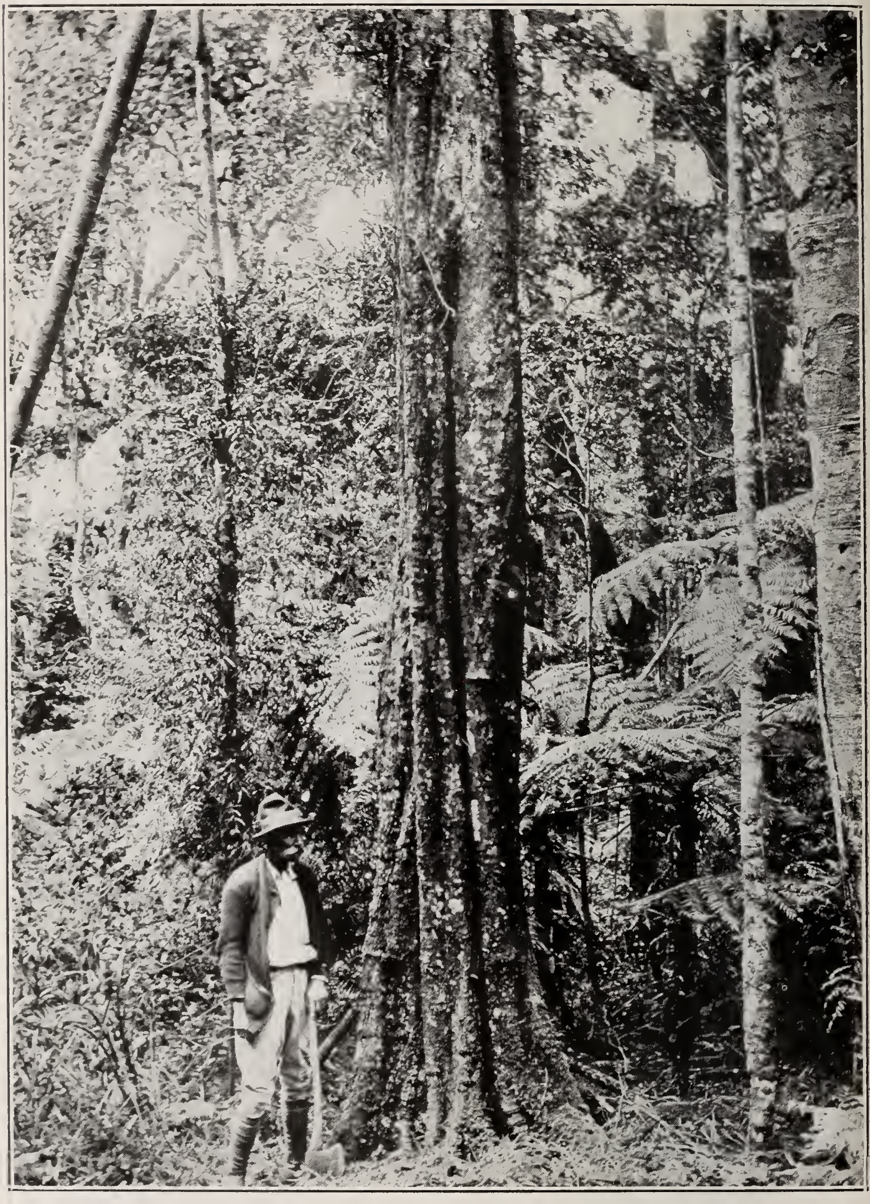


Fig. 216.—Myrtle Ebony (*Diospyros pentamera*). Roberts Plateau, Macpherson Range, about 28.3° S. Many of the trees in lowland areas are much more symmetrical than this example. The Tree Fern in background on right is *Alsophila Leichhardtiana*.

(*Photo.: W. D. F.*)

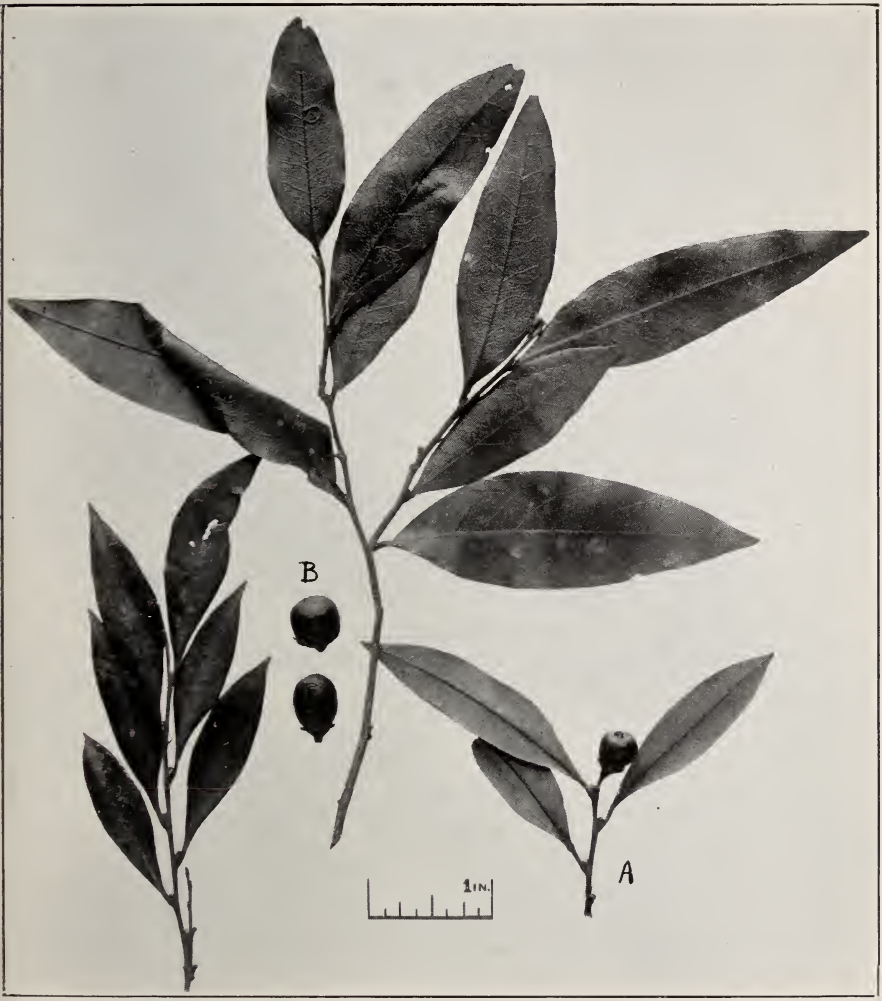


Fig. 217.—MYRTLE EBONY (*Diospyros pentamera*). The small, fruit-bearing branchlet at A has the underside of leaves exposed; B, detached fruit. The branchlet on left shows the smaller leaves often found on large trees. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

5. with a 5-lobed calyx 1 line long, with the corolla 5-lobed and twice as long as the calyx, and with 15–20 stamens. Fruit globular, nearly $\frac{1}{2}$ in. in diameter in our dried specimens, enclosed at the base in the enlarged calyx, and containing 2–5 large angular seeds.

Distribution.—Coastal scrubs from the Hunter River, N.S.W. (F.v.M.), to Atherton, North Queensland.

Uses.—The timber may be useful for tool handles. Like a large number of scrub woods it could be used for indoor fittings.

References.—Diospyros pentamera F.v.M., Docum. Intercol. Exhib. 35, 1866; *Cargillia pentamera* Woolls & Mueller in Mueller's Fragmenta Phytographiae Australiae, vol. 4, p. 82, 1863–1864.

2. MABA.

Maba fasciculosa F.v.M. Up to 100 ft. high and 15 in. stem diameter. Bark dark grey. Stem not buttressed. Leaves alternate; stalks $\frac{1}{4}$–$\frac{3}{8}$ in.; blades elliptical, blunt or drawn out into blunt point at apex, often unequal-sided, $2\frac{1}{2}$–5 in. long, 2–3 times as long as broad. Fruit in groups in forks of leaves; stalk of each fruit $\frac{1}{8}$ in.; calyx at base of fruit cup-shaped, $\frac{3}{8}$–$\frac{1}{2}$ in. in diameter and 3- or 4-lobed. Fruit oval, up to $\frac{5}{8}$ in. long, containing about 3 compressed seeds about $\frac{4}{10}$ in. long.—North Coast, N.S.W. (Moore), to Eungella Range.

Maba geminata R.Br. Small tree. Leaves alternate; stalks $\frac{1}{8}$–$\frac{1}{4}$ in.; blades elliptical, egg-shaped, or reversed egg-shaped in outline, rounded or blunt at apex, often narrowed at base, $1\frac{1}{2}$–$3\frac{1}{2}$ in. long, $1\frac{1}{2}$–2 times as long as broad. Fruit in clusters in forks of leaves or at scars of fallen leaves. Fruit-stalks inconspicuous or $\frac{1}{24}$ in. long. Fruit egg-shaped or globular, $\frac{3}{8}$ in. long, surrounded at base by cup-shaped, broadly 3-lobed calyx. Seeds 1–4 in fruit examined, $\frac{1}{4}$–$\frac{1}{3}$ in. long.—Southport to Bowen.

Maba humilis R.Br. Native Ebony. Small tree. Heartwood often black. Leaves alternate; stalks about $\frac{1}{24}$ in.; blades egg-shaped or reversed egg-shaped in outline, rounded, indented or blunt at apex, often narrowed at base, $\frac{3}{4}$–$1\frac{3}{8}$ in. long, $1\frac{1}{2}$–2 times as long as broad. Fruit on indistinct stalks up to $\frac{1}{24}$ in. long, single in forks of leaves. Fruit egg-shaped, $\frac{3}{8}$ in. long, enclosed at base in 3-lobed cup-shaped calyx, containing 2–3 dark-brown seeds $\frac{1}{5}$ in. long.—Queensland, dry scrubs. Chinchilla, Queensland; Atherton Tableland, North Australia (Benth.).

Family SYMPLOCACEAE.

Symplocos spicata Roxb., var. **australis** Benth. Attaining 100 ft. high and 2 ft. 4 in. stem diameter. Stem not buttressed. Bark brown, finely scaly; when cut, brown, $1\frac{1}{4}$ in. thick on a tree 2 ft. 4 in. stem diameter. Foregoing is the field description of tree on Eungella Range, west of Mackay. Leaves alternate; stalks $\frac{3}{8}$–$\frac{7}{8}$ in.; blades elliptical or lance-shaped, firm or almost rigid, margins often toothed, 3–$5\frac{1}{2}$ in. long, $2\frac{1}{2}$–$3\frac{1}{2}$ times as long as broad. Flowers stalkless in a branched inflorescence consisting of spikes; flowers $\frac{1}{4}$–$\frac{3}{8}$ in. across, corolla lobes $\frac{1}{8}$–$\frac{3}{16}$ in. long, corolla tube very short. Fruit egg-shaped, often less than $\frac{1}{2}$ in. long, bearing the remains of the 5 inconspicuous calyx lobes at apex.—Richmond River (Benth.) to Atherton; East India; East Indies; Lord Howe Id.; Fiji.

Symplocos Thwaitesii F.v.M. Very closely allied and similar to *S. spicata*, but flowers described as having a short stalk not exceeding $\frac{1}{12}$ in. and corolla lobes described as $\frac{1}{4}$ in long. It is difficult or impossible to separate satisfactorily this from the preceding species among the forms in the Queensland Herbarium.—Hastings River (Benth.) to Johnstone River.

Family OLEACEAE.

Inflorescence much branched, situated at ends of branchlets or in forks of upper leaves, sometimes exceeding the leaves in length .. 1. *Olea.*

Inflorescence often raceme-like or of raceme-like branches, situated in leaf-forks and mostly less than half the length of the leaves .. 2. *Notelaea.*

1. OLEA.

Olea paniculata R.Br. Australian Olive, Native Olive, Pigeonberry Ash (Evelyn, N.Q.), Clove Berry (a name quoted by R. T. Baker), Maulwood of Lord Howe Island (J. H. Maiden). Figs. 218 and 219.

Derivation.—Olea from Greek *elaia,* the olive tree; paniculata from Latin *panicula,* a tuft (alluding to the loose flower cluster, the paniculate inflorescence).

Description.—A tree attaining 100 ft. in height and a stem diameter of 2 ft. Stem often buttressed at the base in the larger trees. Bark brown to grey, often wrinkled and marked by pustules, the pustules frequently being arranged in the wrinkles in rows; when cut, yellowish brown, measuring $\frac{1}{4}$–$\frac{3}{8}$ in. thick on a tree with a stem diameter of 2 ft. Sapwood white when first cut. Freshly cut green timber and bark turn pink after a few minutes exposure to the air. All parts hairless. Branchlets mostly grey, marked by small raised dots (lenticels), smaller than a pin's head. Leaf-stalks $\frac{1}{3}$–$\frac{1}{2}$ in. long. Leaves opposite, egg-shaped or lance-shaped in outline, drawn out into a fine point at the apex, upper surface dark green and glossy, under surface duller; midrib and lateral nerves visible on both sides, numerous fine net-veins often visible on the underside; measurement of leaf-blade 2–4 in. long, $2\frac{1}{2}$–3 times as long as broad. Flowers in inflorescences (panicles), the panicles often consisting of three main branches at the base (trichotomous), situated at the ends of branchlets and in the forks of the upper leaves and sometimes exceeding the leaves in length. The individual flowers, which are borne on distinct stalklets, measure about $\frac{1}{4}$ in. in diameter when expanded. The lowermost part of the flower, the calyx, is minute and cup-shaped, about $\frac{1}{16}$ in. long and divided to about half its length into 4 triangular lobes at its rim. On the inner side of the calyx is the cream-coloured corolla, which consists of 4 petals united at the base, each petal measuring about $\frac{1}{8}$ in. long. On the inner side of the corolla and inserted on its base are the 2 stamens, which are nearly as long as the petals; the stamens consist of a heart-shaped anther inserted on a fine stalklet. The ovary, in the centre of the flower, is oval or nearly round, contains 2 cells, and is surmounted by a small almost 2-lobed stigma. Fruit egg-shaped or narrowly egg-shaped, often oblique, about $\frac{1}{2}$ in. long, bluish black, not very succulent, generally containing a single seed. Flowering period evidently irregular, as there are in the Queensland Herbarium specimens in flower which were collected in May, June, October, and December.

Distribution.—Coastal scrubs of Eastern Australia from the Hunter River, N.S.W. (Bentham), to the Atherton Tableland, North Queensland. It is also found on Lord Howe Island and New Caledonia.

Uses.—The timber should be very suitable for cabinet-work and indoor fittings. J. H. Maiden states that the tree is found all over Lord Howe Island where it attains a diameter of 4 ft. and where the timber is used for fencing, firewood, and all purposes. (*See* Proceedings of the Linnean Society of N.S.W., vol. 23, p. 131, 1898.)

Reference.—*Olea paniculata*, R.Br., Prodromus, p. 523.

2. NOTELAEA.

Notelaea longifolia Vent. Small bushy tree up to 20 ft. high and 1 ft. stem diameter. Bark rough, somewhat scaly. Branchlets with small raised dots (lenticels). Leaves opposite; stalks $\frac{1}{12}$–$\frac{3}{8}$ in.; blades narrowed at both ends, venation prominent, 2–5 in. long, $2\frac{1}{2}$–$4\frac{1}{2}$ times as long as broad. Fruit black or bluish, egg-shaped, $\frac{3}{8}$–$\frac{1}{2}$ in. long, containing 1 large seed within the pulp.—East Gippsland (F.v.M.) to Atherton Tableland.

Family LOGANIACEAE.

Strychnos arborea A. W. Hill. Up to 60 ft. high and 1 ft. stem diameter. Leaves opposite; stalks $\frac{1}{8}$–$\frac{1}{4}$ in.; blades egg-shaped in outline, broadest towards base, apex gradually pointed or bluntly pointed, 1 or 2 longitudinal nerves on each side of midrib springing from base of blade, upper surface glossy, $1\frac{3}{4}$–3 in. long, $1\frac{1}{3}$–2 times as long as broad. Fruit globose, $\frac{3}{8}$–$\frac{1}{2}$ in. in diameter, with firm rind; seed 1 in each fruit, flattened, about $\frac{1}{4}$ in. in diameter, imbedded in internal pulp.—Brisbane to Rockhampton.

Family APOCYNACEAE.

Ochrosia Poweri F. M. Bailey. Shrub or small tree. Leaves opposite; stalks $\frac{1}{8}$–$\frac{1}{4}$ in.; blades reversed egg-shaped in outline, abruptly drawn out into blunt point at apex, narrowed towards base, broadest towards apex, venation not prominent, $2\frac{1}{4}$–$4\frac{3}{4}$ in. long, 2–3 times as long as broad. Fruit consisting of 2 (sometimes 1) bright-red, elongate-oval carpels slightly exceeding 1 in. long.—Bangalow (Baker) to Gympie.

Ochrosia Moorei F.v.M. Described as slender tree. Leaves opposite; stalks about $\frac{1}{2}$ in.; blades narrow, gradually narrowed at base, gradually drawn out into long blunt point at apex, broadest in upper part, lateral nerves regular and parallel, 3–6 in. long, 4–6 times as long as broad. Fruit red, 2–3 in. long and 1 in. broad.—Clarence River (Benth.) to Tweed River.—The genus *Ochrosia* has been described as having abundant milky juice. The writer has observed that the barks of *O. Kiineri* and *O. elliptica* do not exude milky juice when cut, but the pulp of the fruits often does.

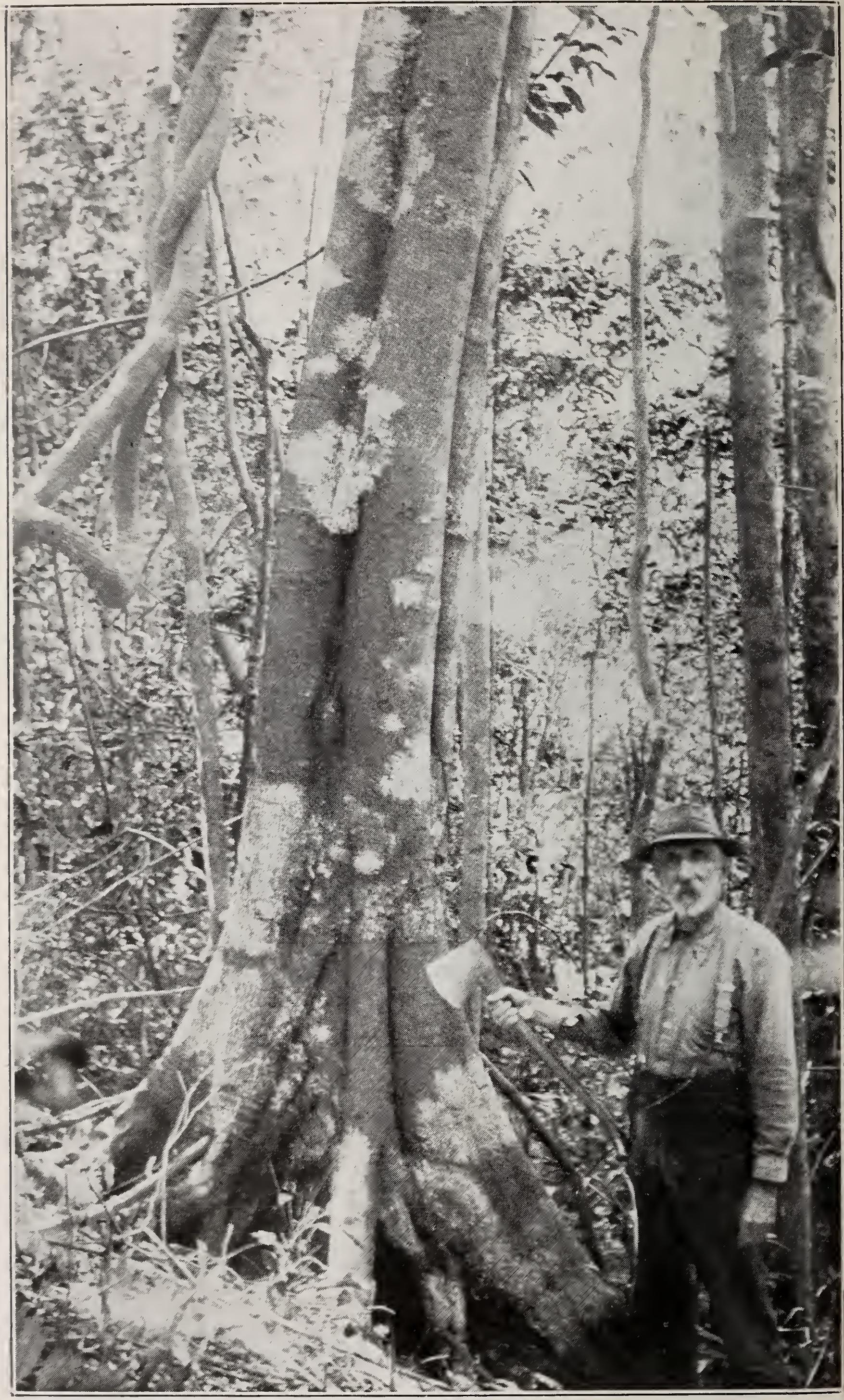


Fig. 218.—Native Olive (*Olea paniculata*). Kin Kin, about 26.2° S. The light-coloured patches on the bark are lichens. The longitudinal wrinkles of the bark are indistinctly shown on the upper part of picture. (*Photo.: W. D. F.*)

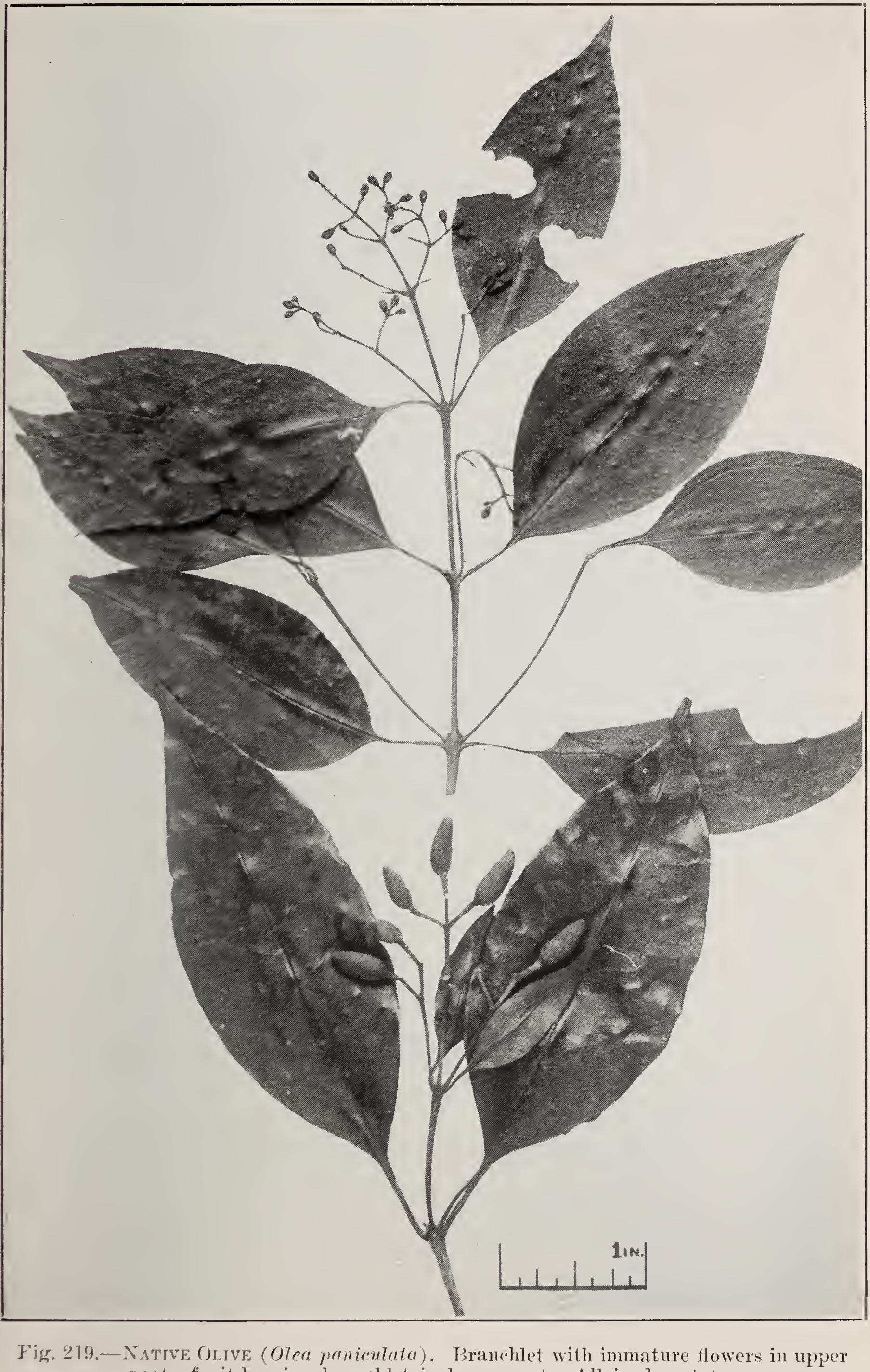


Fig. 219.—Native Olive (*Olea paniculata*). Branchlet with immature flowers in upper part; fruit-bearing branchlet in lower part. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

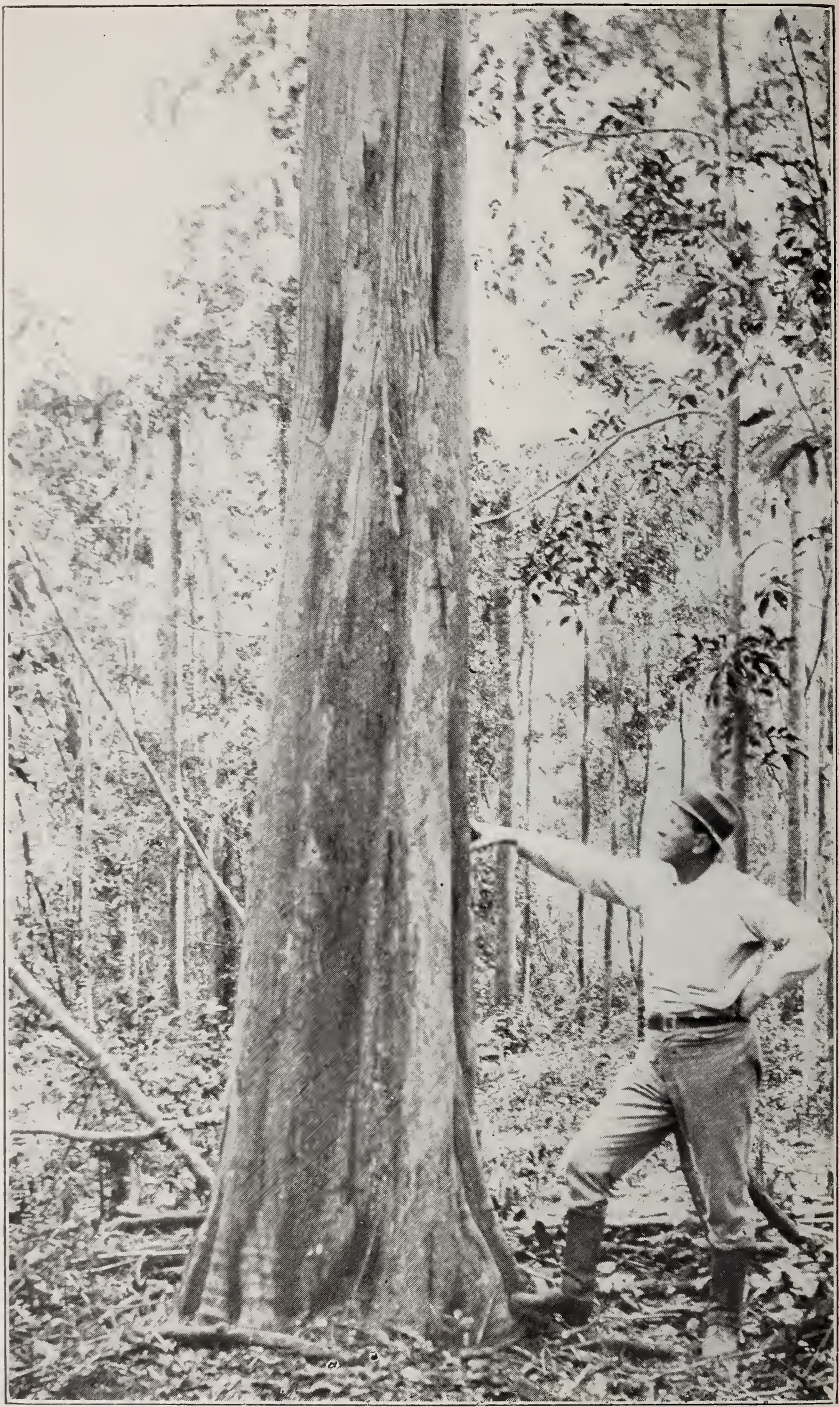


Fig. 220.—Koda (*Ehretia acuminata*). Imbil, about 26.4° S. The channelled stem, which is often a character of larger trees of this species, is shown. The fissures in the bark are shown in upper part. The aerial root of an epiphytic Fig tree is shown on the stem in upper part. (*Photo.: W. D. F.*)

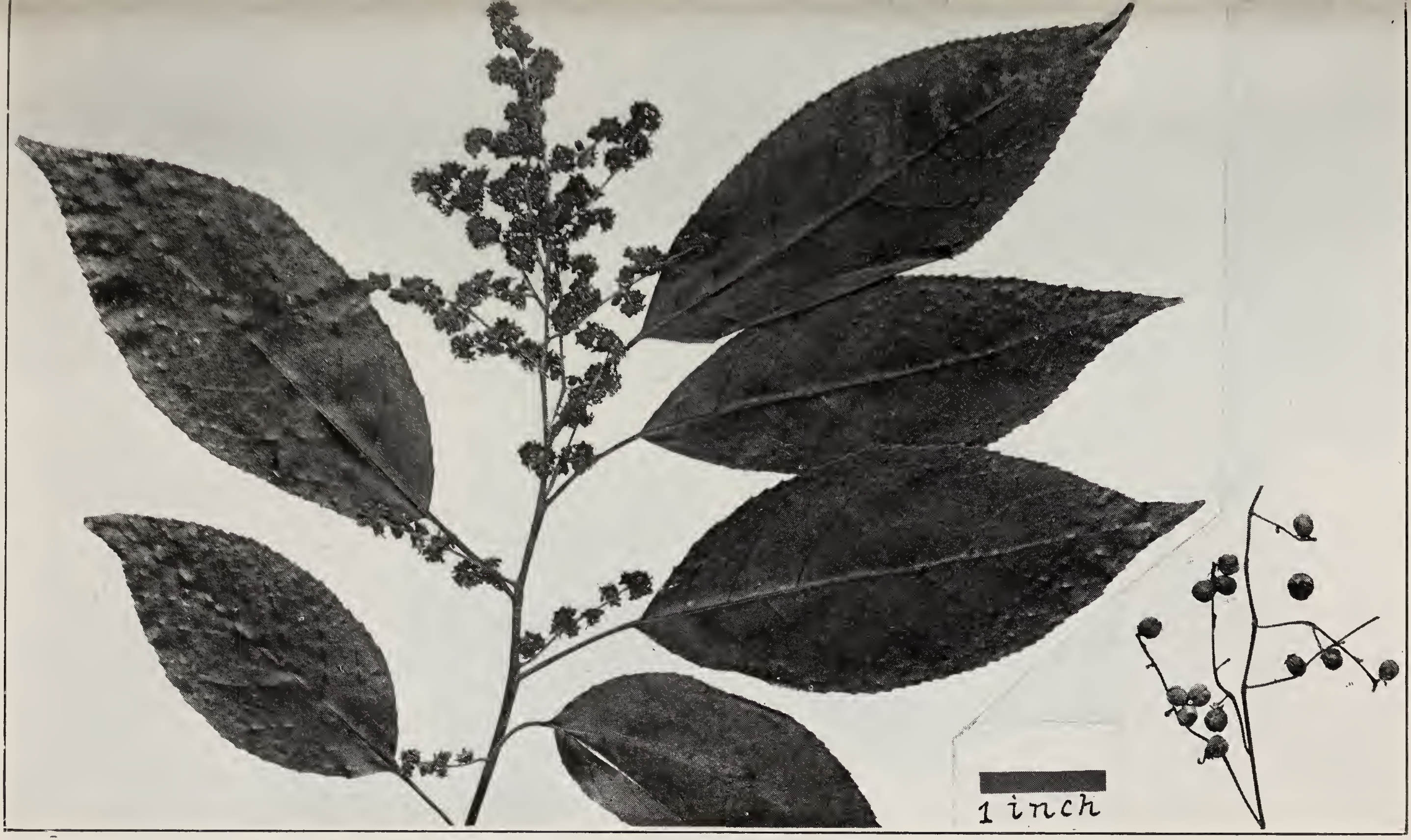


Fig. 221.—Koda (*Ehretia acuminata*). Inflorescence-bearing branchlet. Fruit-bearing twig on right. All to inch scale and all in dry state.
(*Photo.: Dept. Agric. and Stock, Brisbane.*)

Family BORRAGINACEAE.

Ehretia acuminata R.Br. Koda, one of the Indian names; Churnwood (North Queensland). The latter name is not to be recommended, as it is more commonly applied to *Villaresia Moorei*. Silky Ash. Figs. 220 and 221.

Derivation.—Ehretia, after D. G. Ehret; Latin *acuminata*, meaning pointed, from *acumino*, I sharpen (referring to the pointed leaves).

Description.—A large tree attaining a height of about 90 ft. and a stem diameter of about $2\frac{1}{2}$ ft. Stem mostly channelled and angular in section, not deeply buttressed at the base (at least in Southern Queensland scrubs). Bark grey or brown, rather fissured, especially on the ridges of the stem; when cut, almost white, becoming brown on exposure; $\frac{3}{16}$ in. thick on a tree with a stem diameter of 2 ft. 8 in. Sapwood white. Branchlets green, marked by a few white dots (lenticels), and containing a fair quantity of pith. Leaf-stalks often grooved on the upper side, varying in length from $\frac{1}{2}$–$1\frac{1}{4}$ in. Leaves alternate, in outline egg-shaped or elliptical, varying a fair amount in breadth, margins toothed, lighter green on the underside than above, lateral nerves and netted veins prominent, especially on the underside; measurement of leaf-blade 3–6 in. long, varying from 2–3 times as long as broad. Flowers in inflorescences (panicles) at the ends of branchlets and in the forks of the upper leaves; panicles shorter or longer than the leaves. Individual flowers stalkless, measuring about $\frac{1}{5}$ in. in diameter when expanded, white and strongly scented. The lowermost part of the flower, the calyx, is cup-shaped, about $\frac{1}{12}$ in. in length, and has 5 rounded lobes at its rim. On the inner side of the calyx are the 5 petals (which form a corolla) and are united at the base in a short tube measuring about $\frac{1}{24}$ in. The free part of each petal measures about $\frac{1}{12}$ in. in length. Inserted on the inside of the tube of the corolla are 5 bristle-like stamens almost as long as the petals. The ovary (in centre of flower) is smooth and round, and is surmounted by a bristle-like style about $\frac{1}{12}$ in. long, which is forked at the end. Fruit globular, $\frac{1}{6}$–$\frac{1}{4}$ in. in diameter, splitting vertically into 2 parts, each part containing 2 cells, and each cell containing 1 seed. Flowering period: September and October.

Distribution.—India, Japan, Philippine Islands, scrubs of the coast of Queensland (north and south), N. S. Wales as far south as Illawarra (Bentham).

Remarks.—In the field this tree somewhat resembles the Churnwood (*Villaresia Moorei*) and the Lignum Vitae (*Vitex Lignum-vitae*). As a rule, the bark is less fissured or wrinkled than the former, and rougher than the latter.

Uses.—The timber could be used with advantage for many indoor purposes, such as fittings and cabinet-making. In India it is used for making scabbards, sword-hilts, gun-stocks, and is employed in building and agricultural implements. The unripe fruit is pickled; when ripe, it is insipidly sweet, and is eaten (Brandis, Forest Flora of North-west and Central India).

References.—*Ehretia acuminata*, R.Br., Prodromus, p. 497; Bentham, Flora Australiensis, vol. iv., p. 387; F. M. Bailey, Queensland Flora, part iv., p. 1038. Synonyms: *Ehretia serrata* Roxb.; *Ehretia pyrifolia* Don; *Ehretia ovalifolia* Hassk.

Ehretia membranifolia R.Br. Shrub or small tree. Leaves alternate; stalks $\frac{1}{2}$–$\frac{7}{8}$ in.; blades lance-shaped, bluntly pointed at apex, margins entire, $1\frac{1}{2}$–3 in. long, 3–6 times as long as broad. Fruit described as red, $\frac{1}{8}$–$\frac{1}{6}$ in. in diameter, containing 4 cells.—Drier scrubs. Baradine (Maid. and Betche) to Ayr.

Family VERBENACEAE.

Corolla tube long and slender. Stamens protruding from corolla. Calyx enlarged in fruit. Fruit dark or black	1. *Clerodendron.*
Corolla tube large and broad. Stamens included in the corolla tube. Fruit blue	2. *Gmelina.*
Corolla tube under $\frac{1}{2}$ in. long. Stamens shortly protruding from corolla tube. Fruit red	3. *Vitex.*

1. CLERODENDRON.

Clerodendron tomentosum R.Br. Up to 20 ft. high and 3 in. stem diameter. Branchlets with raised dots (lenticels). Leaves opposite; stalks 1–$1\frac{3}{4}$ in.; blades egg-shaped or oval in outline, mostly drawn out into point at apex, hairy or hairless beneath, 3–5 in. long, 2–3 times as long as broad. Corolla of flower white, tubular, $\frac{3}{4}$–1 in. long, stamens protruding about $\frac{3}{4}$ in. beyond corolla. Fruit 4-celled, seated in enlarged basin-shaped, 5-lobed calyx which attains about $\frac{7}{8}$ in. in diameter.—Kiama (Benth.) to Proserpine; North Australia.

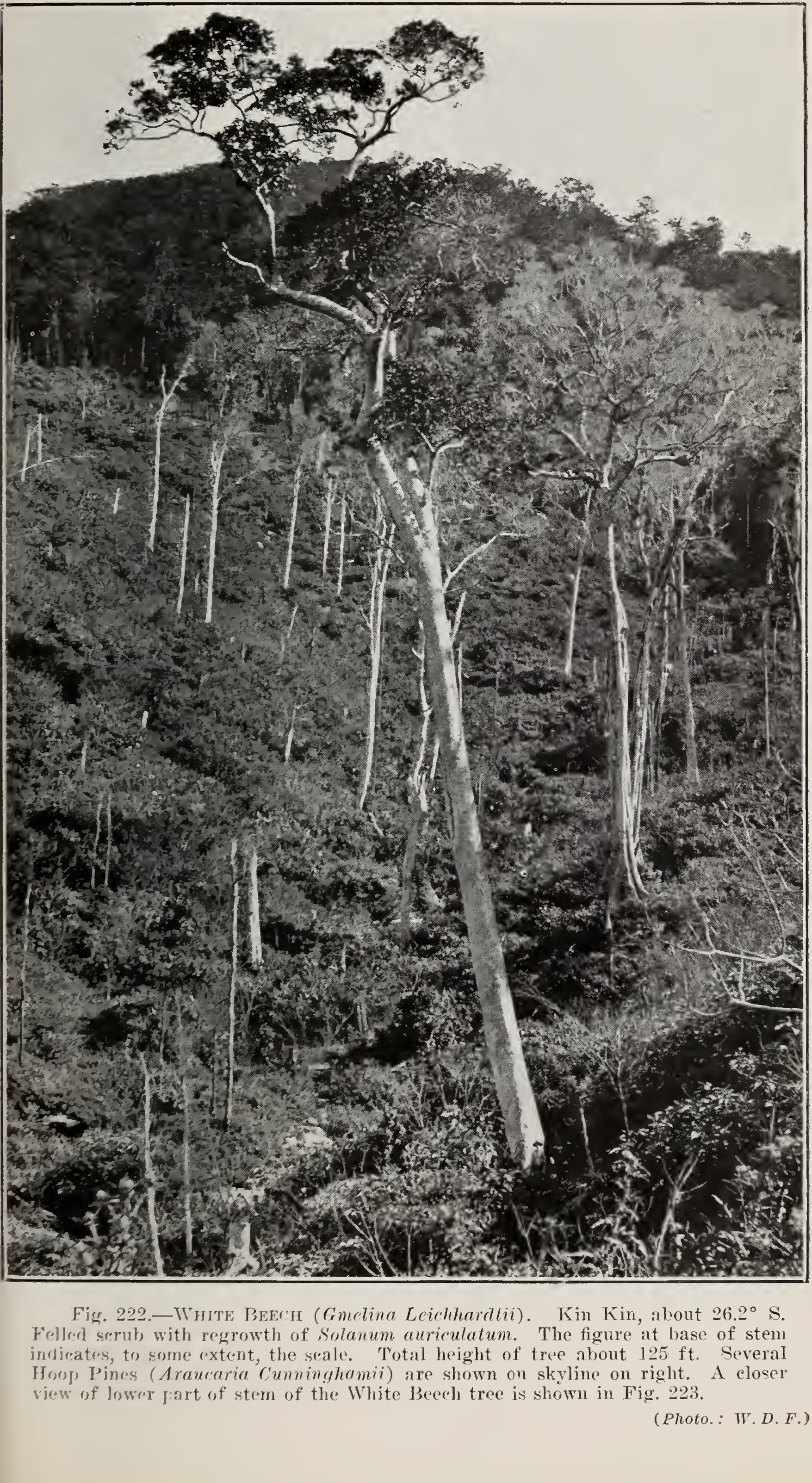


Fig. 222.—White Beech (*Gmelina Leichhardtii*). Kin Kin, about 26.2° S. Felled scrub with regrowth of *Solanum auriculatum*. The figure at base of stem indicates, to some extent, the scale. Total height of tree about 125 ft. Several Hoop Pines (*Araucaria Cunninghamii*) are shown on skyline on right. A closer view of lower part of stem of the White Beech tree is shown in Fig. 223.

(*Photo.: W. D. F.*)

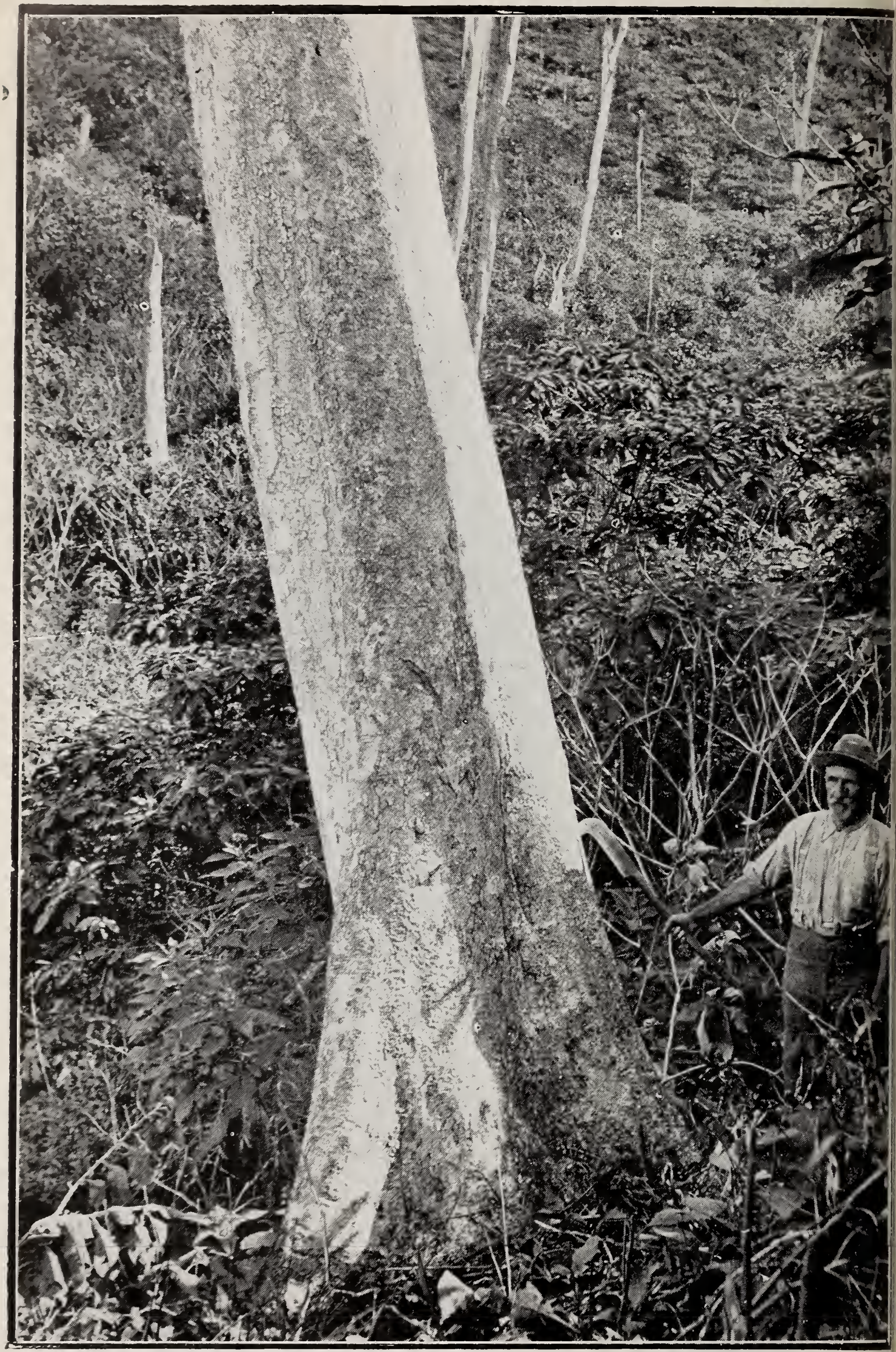
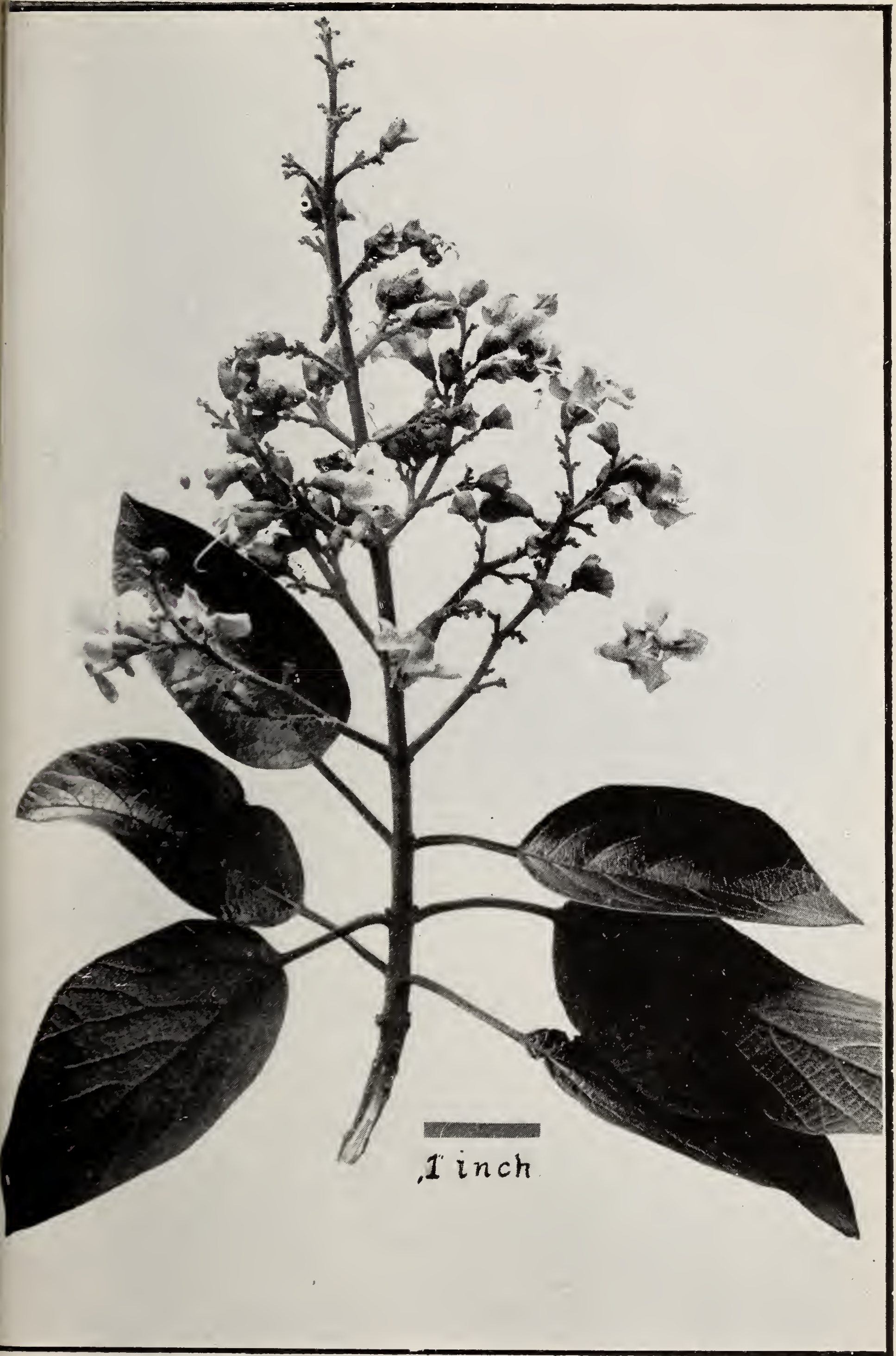


Fig. 223.—White Beech (*Gmelina Leichhardtii*). Kin Kin, about 26.2° S. Basal par of stem of tree shown in Fig. 222. The scales of the bark are shown in upper part. Th shrubby growth surrounding the tree is of *Solanum auriculatum*; it has germinated and grow up after the firing of the felled scrub. The tree was left standing when the scrub was felled

(*Photo.: W. D. F.*)



ig. 224.—White Beech (*Gmelina Leichhardtii*). Inflorescence-bearing branchlet in fresh state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

Clerodendron floribundum R.Br. Resembles foregoing species but the leaves are sometimes broader, the corolla of the flowers longer (1–1$\frac{3}{8}$ in. long), and hairiness lacking.—Northern N.S. Wales (Moore) to Cape York Peninsula ; inland, north-west Queensland ; North Australia ; Papua.

2. GMELINA.

Gmelina Leichhardtii F.v.M. White Beech, Grey Teak. Figs. 222, 223, 224, 8, 9, 10.

Derivation.—Gmelina in honour of John George Gmelin ; Leichhardtii, after Ludwig Leichhardt.

Description.—A large tree attaining a height of 130 ft. and a stem diameter of 4 ft. Stem often flanged at the base but not prominently buttressed. Bark grey or dark grey, scaly, the scales generally angular but occasionally rounded ; when cut, brownish yellow, flesh-coloured near sapwood, measuring $\frac{1}{2}$ in. thick on a tree with a stem diameter of 2 ft. Young shoots, young branchlets, inflorescence, leaf-stalks, and underside of leaves downy with light-brown hairs. Branchlets thick. Leaves partly deciduous. Most of the old leaves are shed in November and the new leaves appear early in December or late in November. Leaf-stalks fairly thick, 1–1$\frac{1}{2}$ in. long. Leaves opposite. Leaf-blades egg-shaped or broadly egg-shaped in outline, apex bluntly pointed ; midrib, lateral nerves, and net-veins visible on both surfaces but very prominent, raised, and hairy on the underside ; measurement of leaf-blade, 3–5 in. long, 1$\frac{1}{2}$–3 times as long as broad. Flowers in large inflorescences (panicles) at the ends of the branchlets, the panicles longer than the leaves. Stalklets of flowers much shorter than the flowers. Flowers large and conspicuous, white marked with purple and yellow. The outer part of the flower, the calyx, is bell-shaped, green, obscurely 2-lipped, and about $\frac{1}{4}$ in. long. On the inner side of the calyx is the corolla (the united petals), measuring about 1 in. long, with 5 lobes or divisions in the upper part, the lobes arranged in 2 lips ; the upper lip consists of the 2 shortest lobes ; the lower lip consists of the 3 longest lobes, and its middle lobe is marked with purple surrounding 2 small bars of yellow. Inserted upon the inside of the corolla and near its base are 4 slender stamens curved at the top, the shorter pair measuring about $\frac{1}{2}$ in. long and the longer pair about $\frac{5}{8}$ in. long. Ovary, in the centre of the flower, globular, surmounted by a slender style about $\frac{3}{4}$ in. long, which is slightly forked at the tip. Fruit nearly globular, broader than deep, blue when ripe, about 1 in. broad, the flattened calyx persistent at the base. The outer fleshy part surrounds a hard "stone." The greater part of the "stone" is divided into cavities and in the uppermost part are 4 cells, each cell containing an oval seed about $\frac{3}{10}$ in. long. Flowering period : November to December.

Distribution.—As far south as the Shoalhaven River, N.S.W. (J. H. Maiden), to Eungella Range (west of Mackay), Queensland.

Uses.—The timber is one of the most useful of Australian scrub woods. It is durable, easy to work, and does not shrink very much. It is used for almost all indoor purposes such as furniture-making, general fittings, and wood-carving. Owing to the high reputation of the timber in the past and present, it is not plentiful now.

Reference.—*Gmelina Leichhardtii* F.v.M. in Bentham's Flora Australiensis, vol. v., p. 66, 1870.

3. VITEX.

Vitex Lignum-vitae A. Cunn. Lignum-vitae, Satinwood, Yellow Hollywood. Figs. 225 and 226.

Derivation.—Vitex, an ancient name for some plant of the osier (willow) tribe (Loudon) ; Lignum-vitae, the colonists' name for the tree.

Description.—A tree attaining a height of 130 ft. and a stem diameter of 3 ft. In many cases the stem is not symmetrical, but angular in cross-section, and mostly is not prominently buttressed at the base. Bark light grey, grey, or sometimes brown, often slightly fissured or wrinkled ; when cut, bright yellow, measuring $\frac{3}{16}$ in. thick on a tree with a stem diameter of 1 ft. 9 in. Young shoots, young branchlets, and inflorescence downy with rust-coloured hairs. Younger branchlets often 4-angled. Leaf-stalks $\frac{1}{4}$–1 in. long. Leaves opposite, elliptical or lance-shaped in outline, mostly pointed at the apex, coppice leaves often lobed or angular on margin, upper surface glossy, underside dull ; midrib, lateral nerves, and net-veins visible on both surfaces, but more prominent on the underside ; measurement of leaf-blade, 2–4 in. long, 2–3 times as long as broad. Flowers few, in small forked inflorescences (cymes) situated in the forks of the leaves, the cymes generally shorter than the leaves. Individual flowers on stalks about $\frac{1}{4}$ in. long, each flower measuring about $\frac{1}{2}$ in. long ; the lowermost part, the calyx, is cup-shaped, hairy, about $\frac{1}{10}$ in. long, and has an entire rim. On the inner side of the calyx is the light purple hairy corolla, which is tubular in the lower part and 4-lobed in the upper part ; it is curved, and the 3 lower lobes are spreading or horizontal, while the upper lobe is erect ; it measures about 4 times the length of the calyx. Inserted in the tubular part of the corolla are 4 stamens, in pairs ; they protrude beyond the lobes of the corolla. The ovary, situated in the centre of the flower, is round and hairless, and is surmounted by a slender style about $\frac{1}{3}$ in. long. The fruit is a red globular berry $\frac{1}{2}$–$\frac{3}{4}$ in. in diameter, enclosing a round "stone" about $\frac{1}{3}$ in. in diameter. The "stone" contains 4 cells ; each cell contains a mature or abortive seed. Flowering period irregular. Both flowers and fruit are often available at various times of the year.

Distribution.—North Coast district of N. S. Wales (C. Moore). In Queensland it extends westward to the Bunya Mountains (about 100 miles inland) ; the northernmost record is Baffle Creek in the extreme south of the Port Curtis district.

Uses.—As the timber is more durable than most of the scrub timbers, it is occasionally used for fencing posts. It should be useful for cabinet-making and indoor fittings.

Reference.—*Vitex Lignum-vitae* A. Cunningham ex Schauer in A. de Candolle's Prodromus, vol. xi., p. 692, 1847.

Vitex acuminata R.Br. Apparently a small tree in Southern Queensland but larger in North. Leaves opposite, consisting of 3–5 leaflets ; leaflet stalklet $\frac{1}{8}$-$\frac{3}{8}$ in. ; blades narrowed at both ends, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, 2–$3\frac{1}{2}$ times as long as broad. There are exceedingly minute, yellow, cup-shaped glands on underside of leaflets. Fruit red, globose, about $\frac{1}{2}$ in. in diameter, the inner hard part containing 4 cells. On the Atherton Tableland the species attains 2 ft. 6 in. stem diameter, and the stem is remarkably similar to that of *V. Lignum-vitae.*—Gympie to Cape York (Benth.) ; North Australia (Benth.)

Family SOLANACEAE.

Duboisia myoporoides R.Br. Corkwood, Eye-opening Tree. Mostly small tree in felled scrub : on Macpherson Range in primeval scrub attaining about 40 ft. high and 8 in. stem diameter. Bark pale or grey, corky and somewhat broken or fissured. Leaves alternate ; stalks $\frac{1}{4}$–$\frac{1}{2}$ in. ; blades bluntly pointed at apex, gradually narrowed at base, fairly soft and not distinctly veined, $2\frac{1}{2}$–$3\frac{1}{2}$ in. long, 3–5 times as long. Flowers white, bell-shaped, $\frac{1}{4}$ in. long. Berry globular, black, about $\frac{1}{4}$ in. in diameter. Leaves contain the alkaloid duboisine, which has similar action to that of atropine on the eye.—Wollongong to Johnstone River.

Family RUBIACEAE.

Inflorescence much branched, at ends of branchlets	1. *Ixora.*
Inflorescence umbellate, in forks of leaves. Corolla tube globose	2. *Hodgkinsonia.*
Flowers in cymes or clusters in forks of leaves	3. *Canthium.*

1. IXORA.

Ixora Becklerii Benth. Up to 15 ft. high and 4 in. stem diameter. Leaves opposite ; stalks $\frac{1}{4}$–$\frac{3}{8}$ in. ; blades glossy above, narrowed at both ends, 3–5 in. long, $2\frac{1}{2}$–3 times as long as broad. Inflorescence at ends of branchlets ; flowers about $\frac{3}{10}$ in. long ; corolla tube $\frac{1}{5}$ in. long, lobes 4, about $\frac{1}{12}$ in. long. Fruit globose, $\frac{3}{8}$ in. in diameter, 2-celled with 1 seed in each cell.—Clarence River (Benth.) to Atherton Tableland.

2. HODGKINSONIA.

Hodgkinsonia ovatiflora F.v.M. Shrub or possibly small tree. Leaves opposite ; stalks $\frac{1}{4}$ in. ; blades lance-shaped or egg-shaped in outline, finely veined below, often drawn out into short blunt point at apex, $1\frac{1}{2}$–$2\frac{3}{4}$ in. long, $1\frac{1}{2}$–$2\frac{1}{3}$ times as long as broad. Inflorescences in forks of leaves, about $\frac{3}{4}$ in. long. Flowers with an oval or globose corolla tube about $\frac{1}{8}$ in. long ; corolla lobes 4, exceedingly short and triangular. Fruit oval or pear-shaped, $\frac{1}{4}$ in. long, containing 2–4 1-seeded cells.—Clarence River (Benth.) to Rockhampton (Benth.).

3. CANTHIUM.

Canthium latifolium F.v.M. (?). Tree up to 1 ft. stem diameter. Surface of sapwood corrugated, the corrugations more regular than those of *Arytera Lautereriana* (*see* Fig. 7). Leaves opposite ; stalks $\frac{3}{8}$–$\frac{5}{8}$ in. ; blades egg-shaped in outline, bluntly

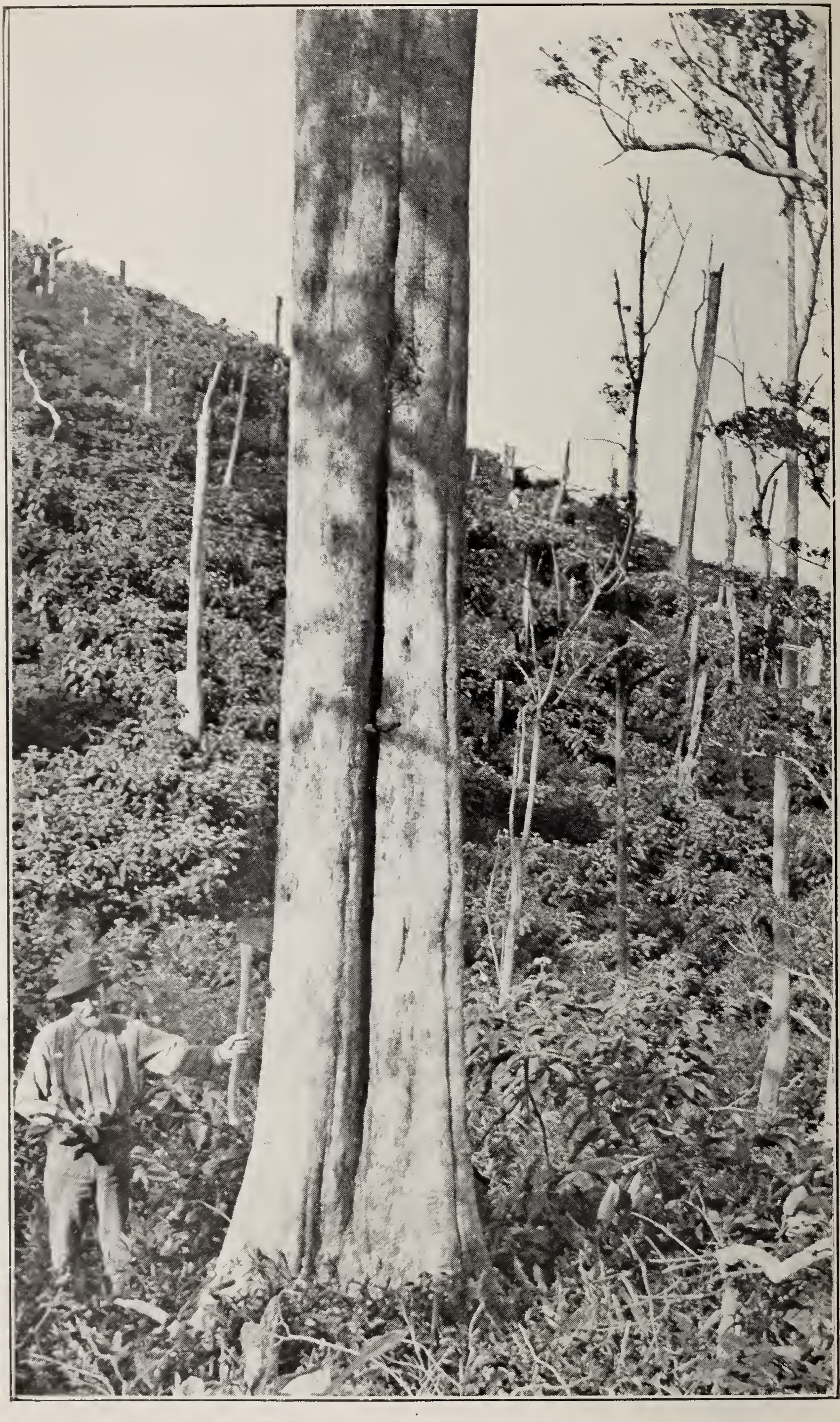


Fig. 225.—Lignum-vitae (*Vitex Lignum-vitae*). Kin Kin, about 26.2° S. A tree left standing in felled scrub. Regrowth in background of *Solanum auriculatum*. The channelled stem, a frequent feature of larger trees of this species, is shown.

(*Photo.: W. D. F.*)

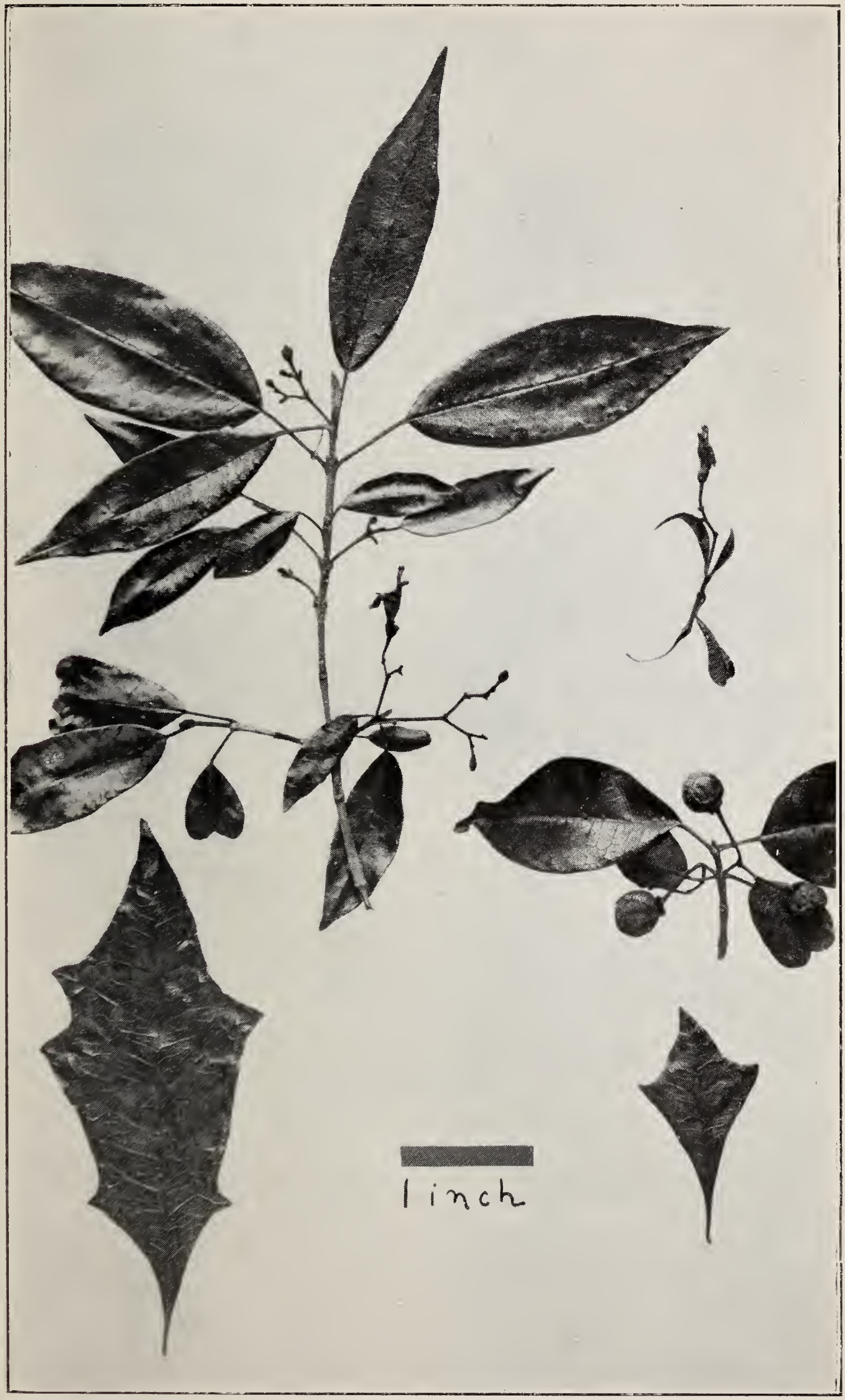


Fig. 226.—Lignum-vitae (*Vitex Lignum-vitae*). Flower-bearing branchlet. Fruit-bearing branchlet on right. Two forms of coppice leaves in lower part. All in dry state.

(Photo.: Dept. Agric. and Stock, Brisbane.)

pointed or drawn out into blunt point at apex, glossy above, 3–4½ in. long, 2–3 times as long as broad. Flowers about ¼ in. long; corolla tube about ⅛ in. long. Flowers arranged in dense inflorescences 1½–2 in. long, 1½–2 in. broad, in the forks of the leaves. May be a broad-leaved form of *C. lucidum.*—Brisbane to Gympie. The microscopic structure of the wood is shown in Fig. 6, Nos. 7 and 8.

Canthium lucidum Hook. & Arn. Up to 50 ft. high and 1 ft. stem diameter. Surface of sapwood corrugated as in foregoing species. Leaves opposite: stalks 1/10–1/5 in.; blades glossy above, often bluntly pointed at apex, narrowed at base, 1¾–2¾ in. long, 2–2½ times as long as broad. Inflorescences in forks of leaves, 1½–2 in. long, 1½–2 in. broad. Flowers about ¼ in. long; corolla tube 1/12 in. long, the 5 lobes ⅛ in. long. Fruit globose or 2-lobed, ¼ in. in diameter, 1- or 2-celled with 1 seed in each cell.—Clarence River (Benth.) to Bowen; as far west as Emerald; Gulf of Carpentaria (Benth.).

Canthium coprosmoides F.v.M. Up to 20 ft. high and 6 in. stem diameter, Sapwood surface often corrugated. Branchlets often 4-angled. Leaves opposite; stalk. 1/10–¼ in.; blades blunt, rounded or sometimes pointed at apex, narrowed at bases margins often recurved, 1½–2½ in. long, 2–2½ times as long as broad. Flowers in groups of 3–6 in forks of leaves. Flowers about ⅜ in. long; corolla tube about ¼ in. long, lobes 5, about ⅛ in. long. Fruit 2-lobed, ⅜ in. broad, 2-celled with 1 seed in each cell.—Macpherson Range to Cairns.

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Printed for the Commonwealth Government of Australia by A. J. Cumming,
Government Printer, Brisbane.

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